Service
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PLAIN PAPER - MAGIC SERIES

Magic, Primo, Memo, Magic Vox, Magic Vox Plus

Pegaso, Office

Service Manual

Plain Paper Fax Ink Technology

The characteristics of a compact Feature phone, an integrated FAX machine with or without integrated Answering Machine, combined with an Intelligent Fax Switch, all in a Plain Paper Fax Machine. Prepared for Cordless Phone management - DECT Technology, Caller ID (country dependant), Document Memory

Safety regulations require that the set be restored to its original condition and that parts which are identical with those specified be used.

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1 Introduction

In this chapter you can find

- Safety precautions
- List of features
- Feature description
- Operating elements

1 SAFETY PRECAUTIONS

1.1 IMPORTANT

1. This Fax Model has been specificated as a Class II unit (ungrounded).
   All digital circuitry is connected to the potential of the Telecom line.
   That means: If you want to measure in the unit with connected Telecom line you have to use **ungrounded** measuring instruments. Otherwise it is possible that you shorten the Telecom potential to ground.
2. Service technicians must be made AWARE OF ESD and be GROUNDED!
   To avoid ESD risk you can order some ESD-equipment in the parts list
3. After each disassembly of the apparatus a high voltage test has to be performed.
   (3kV AC between mains and Telecom line)
4. **Attention**: Discard used of Spare Parts not according to manufacturers instructions.

WARNING!

Before opening the machine disconnect the Power Cable.

Never remove the isolationplate from the PGU

- HIGH VOLTAGE! -

1.2 ESD

1.2.1 General

ESD is a spark jumping from one conductive surface, charged with static electricity to another conductive surface. This incredibly fast movement of static discharge (the charge can jump to that conductor in a nanosecond) can have disastrous consequences, especially for electronic circuitry.We only feel ESD at a discharge of about 3.000 Volts.However many semiconductors can be damaged by a discharge of just 60 Volts or less.On non-conducting materials, such as plastics and textiles, charges remain stationary and cannot discharge and are therefore called static charges.
Static charges are brought in by people and are generated during their normal movements.

1.2.2 Precautions to prevent ESD-damage

Static electricity cannot be eliminated but it can be kept under control. Charging can be prevented by an appropriate grounding system for people and objects that may come into contact with the component or product.

TO PREVENT ESD KEEP THE FOLLOWING RULES:

1. All products being brought in for repair must be
   - processed in an ESD protected working area with a Grounded dissipative mat.
   - kept in ESD protective packing material when not used.
2. Technicians should wear a wrist strap ground connected.

2 FEATURES

2.1 FEATURES

Some features are not available in certain countries.

Telephone features	
Built in handset	
12 key dial pad	
On hook dial	
Ringer volume control	Digital (4 steps)
Speaker volume control	Digital (4 steps)
Redial	Last 5 fax numbers remain in memory
Pulse/tone dialing	User selectable
Dialing features	
Automatic Redial	Auto only for fax
Manual Redial	dial pad
Short dial	Ten touch keys (0-9)
Name dial	Alpha input max 50
Hands Free	TAM model
Transmission	
Manual Transmission	from key pad
Low speed Transmission	4800bps
Send documents during a telephone conversation	press Start key
Voice request	Speak after fax TX
Faxing to sub-addresses	telephone number + * or # key. Send/poll from data banks.
Reception	
Automatic reception	
Manual reception	Press Start key
Polling reception	manual or from memory, then pressing OK.
Intelligent FAX switch	
Day mode - Tel/Fax priority	User can take the the call or Auto Fax RX (except M. Primo)
Night mode - Fax/TAM priority	User should not be disturbed (except M. Primo)
Auto mode	Day and Night activated by timer (except M. Primo)
Easy Link	Call transfer from / to ext. cordless phone via signal generation
Active Fax Switch	ONLY MAGIC PRIMO
Communication	
Page Header	includes TTI + page indicator
TSI / CSI	RX and TX
Compression methods	MH / MR
Copy quality	
Fine, Photo, Standard	
Automatic background control	
TAM features - 15 min	
Speech Generation. (prerecorded OGM)	Place by the user´s specific OGM.
Skip forward	
Replay message	
Pause	On current play operation
Erase one message	
Erase all messages	
Forwarding calls	
Time date stamp	
OGM	Available in different languages
Breakthrough	4 digit code during the OGM
Remote operation	Playback, Rewind, Fordward, Delete..etc.
Memo mode	Internal (note book), External (TAM)
Lists and Reports	
Transmission report	
Error report	
Service report	
System report	Including BSW and NCU-Parameter settings
Stored No. list - tel book	
Function list	Including current setting list
SRAM data list	
LIU-Parameter list	
Scanner Reference Line - Printout	
Service features	
BSW setting	
NCU parameter setting	
SRAM data setting	
LIU-parameter setting	

Others	
Compatibility - G3, ITU 30	
External phone Interface	Cordless phone / TAM serial connection
Caller ID	Country dependant. (n.a. Magic-M. Primo)
Language setting	typical 3 languages
Document Memory Reception DMM	n.a. Magic - M. Primo
LCD size - 1x16 and a line of 6 icons	
ROM 256 or 512 Kb. PLCC type	Easy to replace by Service Tech. through the Software cover.
Power Safe-Mode	in Stand by

2.2 IMPORTANT FEATURES

2.2.1 Telephone features

ON HOOK DIAL AND HANDS FREE

The user can dial and speak without going off hook (only TAM model). Hands Free feature is not available in TAMless model

RINGER VOLUME CONTROL

The volume of the ringer can be adjusted by pressing the arrow left and right key.

SPEAKER VOLUME CONTROL

Speaker volume can be adjusted via software setting by pressing the arrow left and right key.

PULSE/TONE DIALLING

Pulse dialling not available in all countries. Tone is the initial seeting. (tone/pulse setting via user func.15).

2.2.2 Dialling features

AUTOMATIC REDIAL

Only for Fax operation. 3 tries if line is busy.

MANUAL REDIAL WITH REDIAL KEY

Option to repeat any or the last 5 dialled phone numbers by pressing redial key (->>).

SHORT DIAL

By pressing any key from 0 to 9.

NAME DIAL (TEL. BOOK)

By pressing the Telephone Book key A-Z, then the first character of the stored name.

PABX ACCESS

For PABX operation, enter the appropiate settings in function 15. Most PABX support only DTMF signal.

2.2.3 Transmission - up to 10 documents in the ADF

MANUAL TRANSMISSION

A document can be send by only pressing the START key, if there is already a telephone connection.

HALF SPEED TRANSMISSION

Automatic fall-back from 9600 to 7200...4800...2400. A Low Speed setting of 4800bps is available for bad line connections.

SENDING DOCUMENTS DURING A TELEPHONE CALL

Insert the document and press the start-key time during a telephone call. During the transmission voice communication is interrupted.

VOICE REQUEST

While sending a fax, lift the handset. The other party will hear a ringing signal at the end of the fax transmission.
Talk after the fax TX is possible.

FAXING OR POLLING USING SUB-ADDRESSES IN DATA BANKS

Store or dial a number, then press the R key then the subaddress. This will save you money in telephone charges.

2.2.4 Reception

AUTOMATIC RECEPTION

Fax mode active

MANUAL RECEPTION

After you recognize CNG tone, press START. The reception begins.

POLLING RECEPTION

Press the OK/Function Key to after the desire telephone number.

2.2.5 Intelligent FAX switch - settings Function 31 and 32 (in M. Primo n.a.)

The Intelligent Fax Switch is a combination of hardware and software. The hardware part consists mainly of a pseudo loop current feeding, a ringer generator (software driven) and a loop sensor (for the pseudo current). With these hardware extensions, the software is capable to handle following features:

- better detection of the CNG signals for external devices. For example external Answering Machines
- Call transfer between ext. telephone and the fax machine it self.
- silent reception of fax messages (even ext. serial phone does not ring)
- seizing the line from an external phone, even if the internal answering machine is already enable.

Also, the Fax switch is splitted into two modes DAY and NIGHT. The exact behaviour of each mode can be modified by the customer via user funtions 31 and 32. The switching between the Modes, will be handled as a dedicated Mode.

FAX RECEPTION - DAY MODE. TAM and TAMless

Quick:	The fax receives automatically a message with at list 1 audible ring
Expert:	Automatically receive fax mesages with an user configuration ring count
Normal	Automatically receives fax messages
Manual	The user has to press Start manually to receive a Fax message.

TAM OPTIONS - DAY MODE (TAM MODEL)

TAM off	TAM remains disable. The user can set this option
Smart	Enabled after 5 or 2 rings (n/a in expert mode)
ON/loud	Enable after 8 rings (max setting)
ON/muted	Enabled, but the speaker is disabled. (only in expert mode)
	Note that the maximum ring count depends on the TAM repectively on the fax reception settings.

FAX RECEPTION - NIGHT MODE - (TAMless model)

Quiet	Automatic silence fax reception.
Rings	Automatic receive fax message after 5 rings
Fax Expert:	Automatically receive fax messages with an user configurable ring count.

TAM OPTIONS- NIGHT MODE (TAM model)

Rings	Unit rings 1-4 times before the TAM stars with the OGM1
Silent	TAM starts inmediatelly and record ICM´s without enabling the Speaker
Expert	enable TAM after user configurable ringcount. ON but muted.
	Note that the phone should ring at medium level. The maximum ringcount depends on the selected TAM options by the user.

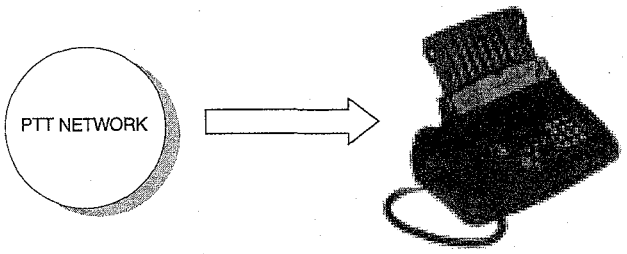
For more information, please check the in User Manual. Serial and Parallel connections have to be take in account for the correct behaviour of the Fax Set.

NOTE: Magic Primo has been designed with a Standard Fax Switch. The Intelligent Fax Switch is not available in this set.

2.2.5.1 Basic Operation - Intelligent Fax Switch

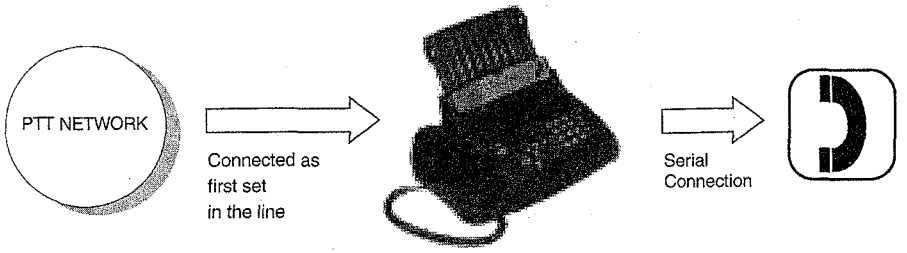
MAGIC SERIES

- Without additional telephones or answering devices



1. Fax answers after first RING (in Night mode not heard)
2. When CNG (fax) tones detected, fax reception starts, otherwise it continues ringing

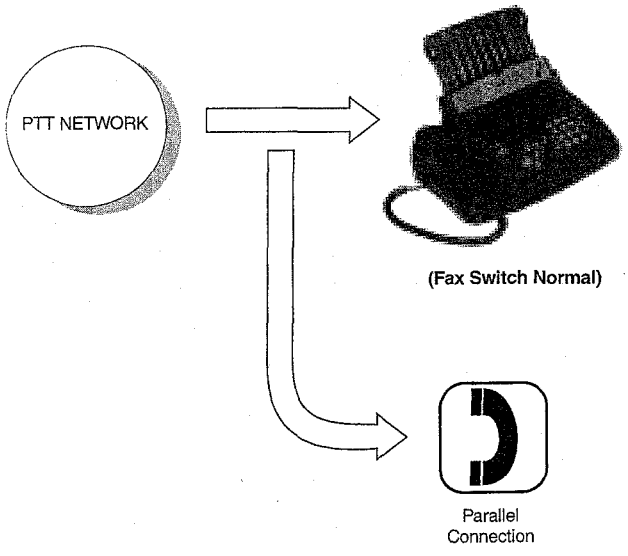
- With serial telephones / TAM (available in some countries only)



(Fax Switch Quick)

1. Fax answers after first RING (in Night mode not heard)
2. When CNG (fax) tones detected, fax reception starts, otherwise it continues ringing

- With parallel telephones / TAM



(Fax Switch Normal)

1. *Fax does not answer incoming call*
2. When ext. phone is lifted, *5 must be pressed to start fax reception
3. After 5 rings fax answers incoming call (ext. phone or TAM stops ringing).

NOTE: DECT technology is recomended for the use of cordless telephones. Magic Primo, works with the conventional Active Fax Switch.

RING BACK (440/700HZ)

The FAX-machine takes the line immediately after a ring has been detected, to provide the possibility of silent fax reception. Due to this fact the FAX machine has to generate the ringback by itself.
The ringback signal will be generated as often as the customer has defined the toll free number of rings.

2.2.6 Communication

PAGE HEADER

TTI and page number are printed on each fax that will be transmitted. It is possible to turn off the page header.

TRANSMIT TERMINAL IDENTIFICATION (TTI)

Identifies the user's fax unit by including the name and fax number that has been programmed into the fax unit on the top of every page. This allows the receiving parties to easily identify the source of all documents being sent to them. FCC regulations also require that transmitted documents identify the sender's name, phone number, transmission date and time.

TSI / CSI

TSI: Identification (Tel. Nr.) of the transmitting machine
CSI: Identification (Tel. Nr.) of the receiving machine

COMPRESSION METHODS

Modified Hoffman: method to reduce the data transferred via the telephone line. All G3 machines offer M.H.-coding.
Modified read: efficient coding system that increases speed by about 15%. M.R. is not available in some G3 machines.

2.2.7 Copy quality

fine: increased vertical resolution from 3,85 to 7,7 lines/mm for transmission of detailed drawings or small characters
photo: resolution mode 32 grey levels for photo TX (TAM model only)

Press the key "fine/photo" to choose the copy mode.

AUTOMATIC BACKGROUND CONTROL

The background control (=intensity difference between the text and the background) is adjusted automatically.

2.2.8 TAM / DMM features

DIGITAL TAM - solid state Flash Memory - 15 min recording

Messages / Documents (up to 25pages) can be stored in solid state devices, no tape is used for recording

RECORDING TELEPHONE CONVERSATIONS

You can record a telephone conversation with your fax machine. Press Rec. while talking. (TAM model)

SKIP FORWARD

Move to next message

REPLAY MESSAGE

Last message is repeated

PAUSE

If you press the PLAY/PAUSE key during play operation, the playback is interupted.

ERASE ONE MESSAGE

The message you have heard can be deleted after hearing the confirmation tone twice.

ERASE ALL MESSAGES

This function erase all recorded messages

FORWARDING CALLS

Incoming messages are automatically forwarded to a preprogrammed telephone number.
You can select the number of messages to be forwarded at the same time.
The party to which the calls are being forwarded needs to enter the access code.

TIME DATE STAMP

The fax machine will automatically record the date and time of every recorded message. If you play back a message, you will see data on display.

OGM

There are two outgoing messages available.
OGM1: The caller will be told to leave a message
OGM2: The caller will be informed about the end of the recording

BREAKTHROUGH

During the OGM, a code can be given. This will override the TAM and the machine will ring again.
If you have activated the function you will hear no rings and any incoming call will be answered automatically.
Only callers who dial the breakthrough code (4-digit) can let the fax machine ring.

REMOTE OPERATION

Via DTMF dialing the recorded messages can be played back from any place you want.

Funktion	Key
Stop	(0)
Pause/Play	(1)
Forward	(2)
Rewind	(3)
Delete this only	(4)
Delete All	(5)
Repeat All	(6)
Record OGM	(8)
Switch TAM ON/OFF	(9)

remark: in some countries the user who makes remote access, has to press any key at least once. Otherwise, the connection will be interrupted. (Line disconnect condition)

MEMO MODE

Internal memo
You can record a personal message with this function. Your fax machine thus becomes a note pad. Messages can only be heard on the fax machine itself or by remote control from a telephone.
External memo
You can record a message which the caller can hear without being able to leave a message in return. Turn it Off if not in use.

2.2.9 Lists and Reports

TRANSMISSION/ERROR REPORT

Every time you send a document your fax machine prints a transmission report. If an error occurs during transmission you will be informed by the error report, which is printed out.

Examples for transmission - and error report:

TRANSMISSION REPORT 15-MAY-98 9:07

FROM (OWNER):	+43 1 12345
TO :	+43 1 54321
DIALLED NUMBER:	54321
PAGE(S):	1
DURATION :	0' 26''
RESOLUTION:	STANDARD
RESULT:	OK

ERROR REPORT 15-MAY-98 9: 09

FROM:	+43 1 12345
TO (OWNER):	+43 1 54321
PAGE(S):	1
DURATION :	0' 48''
RESOLUTION:	STANDARD
ERROR IN PAGE (S):	1

SERVICE REPORT

Listing of occured transmission-errors...

SYSTEM REPORT

Listing of current settings including the BSW- and NCU parameter list

STORED NO. LIST

This function provides you with a list of the short dial and name dial numbers you have stored.

FUNCTION LIST

Listing of all functions including a current settings list

SRAM(MEMORY)-DATA LIST

Partial selectable listing of SRAM contents: Factory Only

LIU-PARAMETER LIST

Listing of all LIU-OTPROM data

SCANNER REFERENCE LINE - PRINTOUT

The scan. ref. line is a graph of the current CIS-condition

2.2.10 Service feature

BSW-SETTING

Change the Bitswitch settings. Determine some parameters for the telephone interface.

NCU-PARAMETER SETTING

Change the NCU-parameter. Software commands for the machines behavior.

SRAM(MEMORY) DATA SETTING

Change address in the SRAM data. Factory Only

LIU-PARAMETER SETTING

Change the LIU-parameter like ringing values, pulse etc, by the use of right codes. (See page 2-15)

2.2.11 Others

CLOCK SETTING

Set actual date and time for a correct fax header.

LANGUAGE SETTING

You can select the language in which messages are displayed and reports printed out. (Service Reports in English normally)

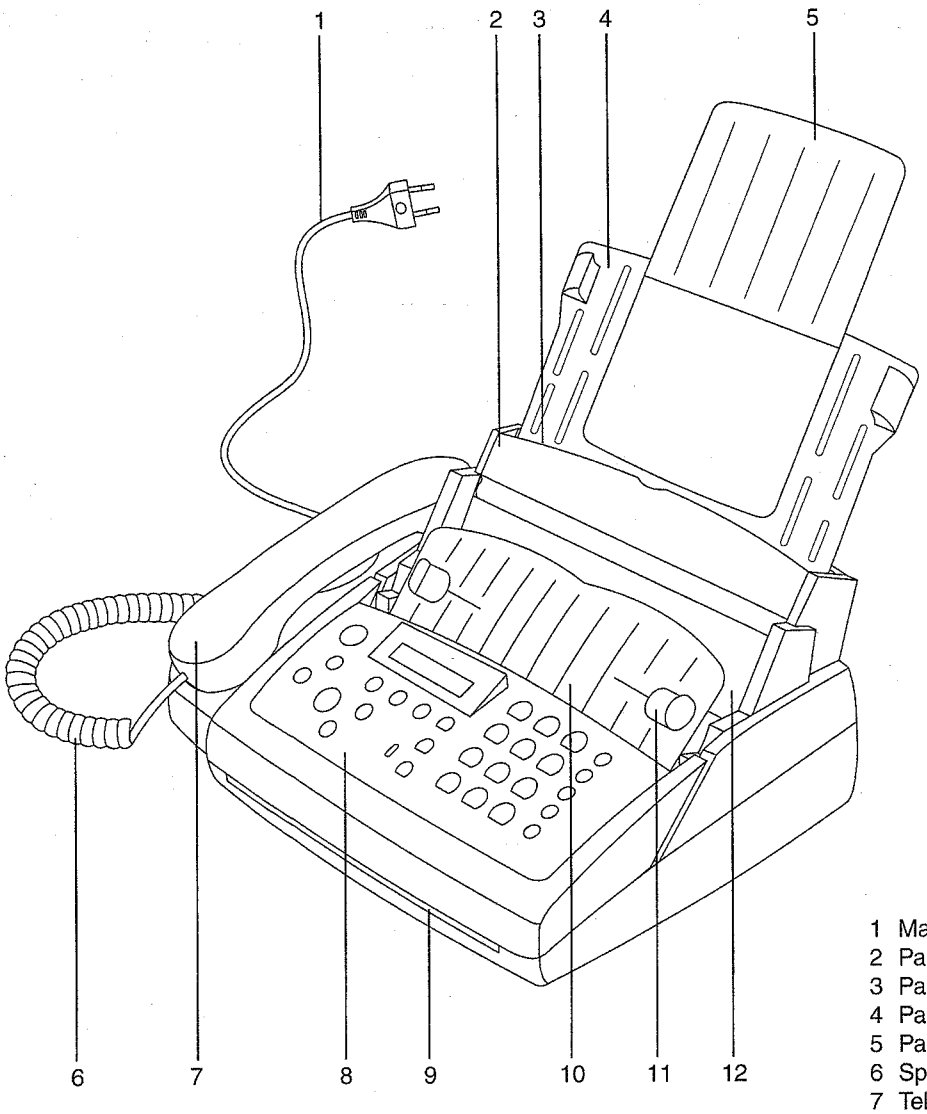
POWER SAVE MODE

The machine is on Power save mode under the Stand by condition, automatically. About 3 W consumption.

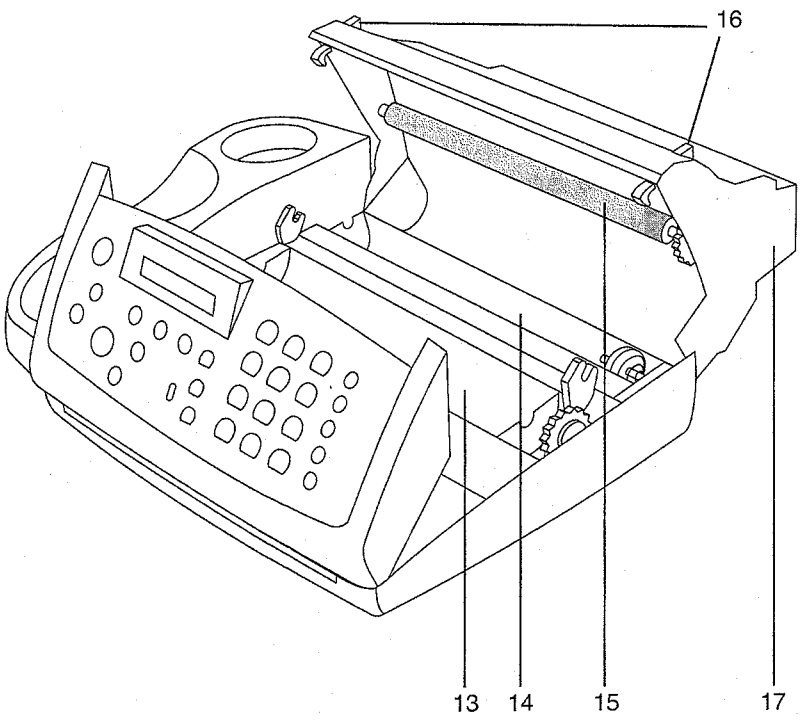
The machine will wake up from power save by following events (no settings necessary):

Key pressed
Ring detected
Document inserted
Handset lifted
External ph one detected

3 OPERATION ELEMENTS

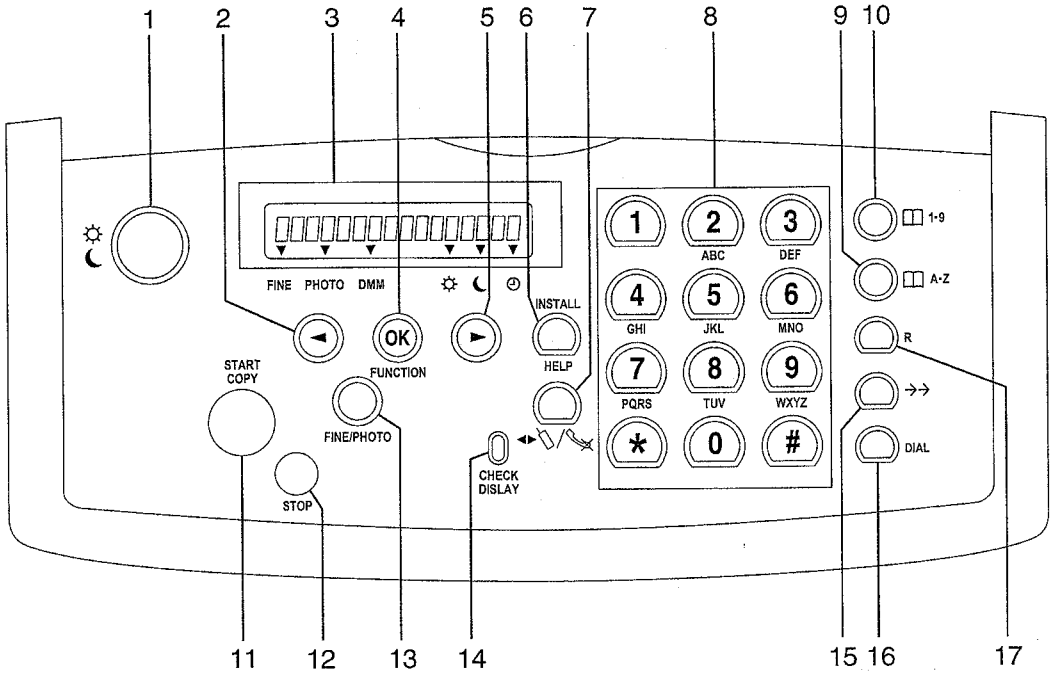


1 Mains cable with power plug
2 Paper refill flap
3 Paper feed mechanism
4 Paper tray
5 Paper tray extension
6 Spiral cable for the telephone handset
7 Telephone handset
8 Operation panel
9 Document outlet
10 Document feed slot
11 Document width adapter
12 Paper outlet



13 Front ink film compartment
14 Rear ink film compartment
15 Grey printer roller
16 Blue release levers for opening the ink film cover
17 Ink film cover

3.1 Magic Memo



1 DAY/NIGHT/TIMER key: to select the different operation modes
Press **briefly**: to choose between DAY and NIGHT
Press and **hold** (at least for 2 seconds): to select the TIMER mode
(the precise settings must be made in function 31 DAY, 32 NIGHT or 33 TIMER—see chapter **4 The fax switch**)

2 CURSOR LEFT key: Press **briefly**: to select options/to adjust the volume/to delete a character
Press and **hold** (at least for 2 seconds): delete a complete line

3 Display: see chapter **1 Introduction**/Description of the machine

4 FUNCTION key/OK key: for calling up functions/to confirm entries/for rapid access to fax reports

5 CURSOR RIGHT key: to select options/to adjust the volume/to insert a blank when entering a name

6 HELP key: Press **briefly**: printout of operating instructions for the most important functions
Press and **hold** (at least for 2 seconds): printout of an EASY INSTALL guidance

7 MUTE/CALL TRANSFER key: if this key is pressed during a call, the microphone will be temporarily muted/this key is also used to transfer a call from the fax machine to an additional telephone connected in series to the fax machine

8 Dial pad for entering numbers and names

9 TELEPHONE BOOK key: Press **briefly**: to call up a name entry
Press and **hold** (at least for 2 seconds): to store a name entry

10 SHORT DIAL 1 - 9: Press **briefly**: to select a telephone number quickly
Press and **hold** (at least for 2 seconds): to store a telephone number

11 START/COPY key: to start transmission or to copy

12 STOP key: stops procedures

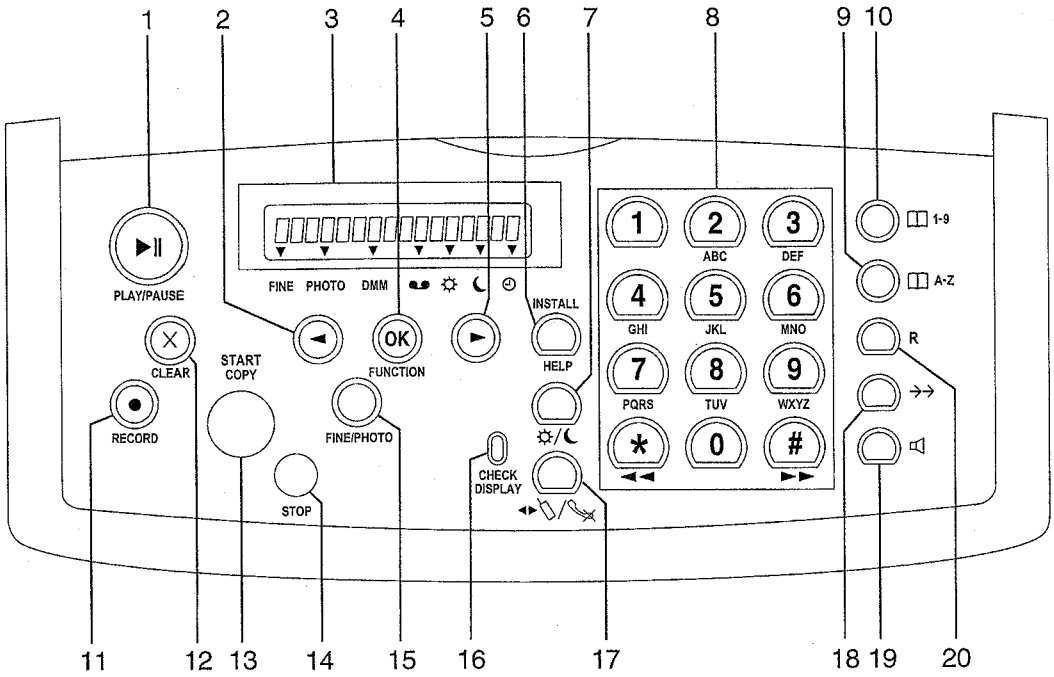
13 FINE/PHOTO key: to select a higher resolution when copying or sending (FINE—for text and graphics; PHOTO —for photographs)

14 Indicator lamp CHECK DISPLAY: if this lamp flashes, please read the message on the display

15 REDIAL key: Press **briefly**: to repeat the last 5 numbers you have dialled/to make a dialling pause between two digits
Press and **hold** (for at least 2 seconds): to browse the list of callers

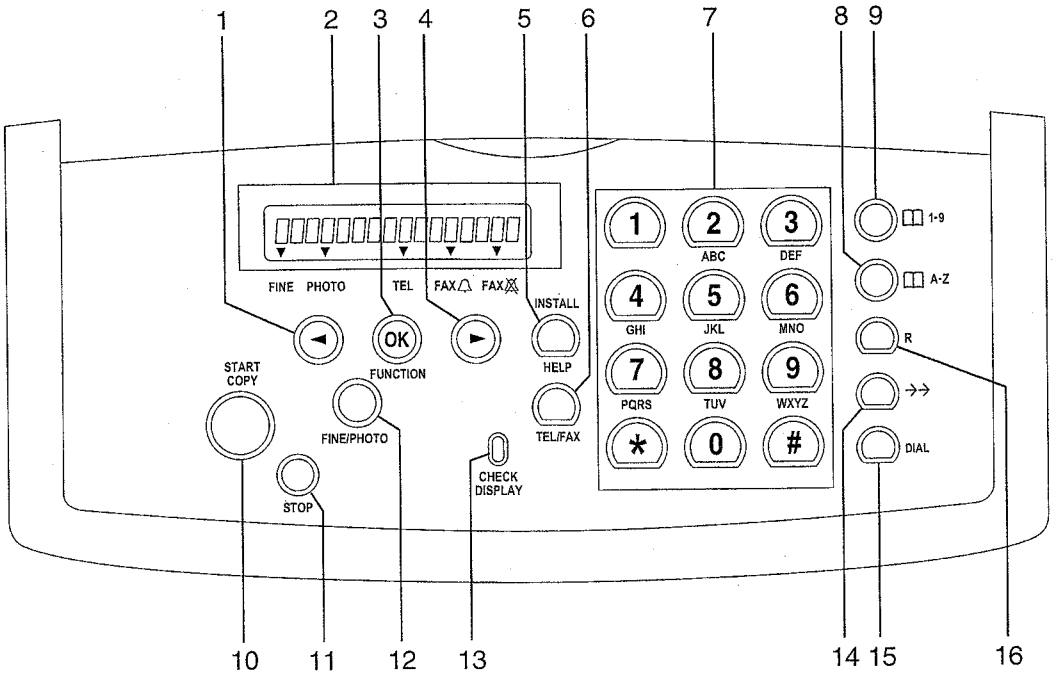
16 DIAL key: for dialling without lifting the handset

17 R key: for special functions e.g.: for the use with a private branch exchange (on a modern connection, for switching to another call) and for using various functions provided by your service provider (call waiting etc.)



1 PLAY/PAUSE key: to play back messages. The key flashes when new messages and memos have been recorded.
2 CURSOR LEFT key: Press **briefly**: to select options/to adjust the volume/to delete a character
Press and **hold** (at least for 2 seconds): delete a complete line
3 Display: see chapter **1 Introduction**/Description of the machine
4 FUNCTION key/OK key: for calling up functions/to confirm entries/for rapid access to fax reports
5 CURSOR RIGHT key: to select options/to adjust the volume/to insert a blank when entering a name
6 HELP key: Press **briefly**: printout of operating instructions for the most important functions
Press and **hold** (at least for 2 seconds): printout of an EASY INSTALL guidance
7 DAY/NIGHT/TIMER key: to select the different operation modes
Press **briefly**: to choose between DAY and NIGHT
Press and **hold** (at least for 2 seconds): to select the TIMER-mode
(the precise settings must be made in Function 31 DAY, 32 NIGHT or 33 TIMER—see chapter **4 The fax switch**)
8 Dial pad for entering numbers and names
9 TELEPHONE BOOK key: Press **briefly**: to call up a name entry
Press and **hold** (at least for 2 seconds): to store a name entry
10 SHORT DIAL 1 - 9: Press **briefly**: to select a telephone number quickly
Press and **hold** (at least for 2 seconds): to store a telephone number
11 RECORD key: Press **briefly**: to play back your outgoing messages
Press and **hold** (at least for 2 seconds): to record a new outgoing messages
12 CLEAR key: to delete messages and entries
13 START/COPY key: to start transmission or to copy
14 STOP key: stops procedures
15 FINE/PHOTO key: to select a higher resolution when copying or sending (FINE—for text and graphics; PHOTO —for photographs)
16 Indicator lamp CHECK DISPLAY: if this lamp flashes, please read the message on the display
17 MUTE/CALL TRANSFER key: if this key is pressed during a call, the microphone will be temporarily muted/this key is also used to transfer a call from the fax machine to an additional telephone connected in series to the fax machine
18 REDIAL key: Press **briefly**: to repeat the last 5 numbers you have dialled/to make a dialing pause between two digits
Press and **hold** (for at least 2 seconds): to browse the list of callers
19 LOUDSPEAKER key: for dialling without lifting the handset and for handsfree operation
20 R key: for special functions e.g.: for the use with a private branch exchange (on a modern connection, for switching to another call) and for using various functions provided by your Service Provider (call waiting etc.)

3.2 Magic Primo



1 CURSOR LEFT key:
Press briefly: to select options/to adjust the volume/to delete a character
Press and hold (at least for 2 seconds): delete a complete line
2 Display (also see chapter 1 Introduction/Description of the machine)
3 FUNCTION/OK key: for calling up functions/to confirm entries/for rapid access to fax reports
4 CURSOR RIGHT key: to select options/to adjust the volume/to insert a blank when entering a name
5 INSTALL/HELP key: Press briefly: printout of operating instructions for the most important functions
Press and hold (at least for 2 seconds): printout of an Easy Install guidance
6 TEL/FAX key: to select the different operation modes
7 Dial pad for entering numbers and names
8 TELEPHONE BOOK key: Press briefly: to call up a name entry
Press and hold (at least for 2 seconds): to store a name entry
9 SHORT DIAL 1 - 9: Press briefly: to select a telephone number
Press and hold (at least for 2 seconds): to store a telephone number
10 START/COPY key: to start transmission or to copy
11 STOP key: stops procedures
12 FINE/PHOTO key: to select a higher resolution when copying or sending (FINE - for text and graphics; PHOTO - for photographs)
13 CHECK DISPLAY indicator lamp: if this lamp flashes, please read the message on the display
14 REDIAL key: to repeat the last 5 numbers you have dialled/to make a dialling pause between two digits
15 DIAL key: for dialling without lifting the handset
16 R key: for special functions e.g.: for the use with a private branch exchange (on a modern connection, for switching to another call) and for using various functions provided by your service provider (call waiting etc.)

II Functions

In this chapter you can find

- Print out of the Function List
- User Function (basics)
- Description Service Mode
- Description Service Functions

4 GENERAL

4.1 FUNCTION LIST

Enter in Service Mode to print this List. The function list is a summary of all user and service functions and includes additional current settings.The structure of all functions is divided in two sections: User functions / Service functions
For Magic Primo, the Functions 2 Fax and 3 Fax Switch listed here might not apply.

Example for the Function list for the TAMlessmodel :

FUNCTION LIST

1 SET UP	2 FAX	3 FAXSWITCH	4 OTHERS
11 SET LANGUAGE 12 TIME/DATE 13 YOUR TEL. NO. 14 YOUR NAME 15 DIAL MODE 16 STORE NUMBERS	21 SLOW (4800) 22 POLLED REC: 23 POLLING SEND 24 SEND LATER 25 SIZE COMPR:	31 DAY 32 NIGHT 33 TIMER 34 EASY LINK	41 FAX JOURNAL 42 DIALLING LIST 43 TRANSM. REPORT 44 RINGER TYPE 45 SERVICECODE
6 ADJUSTMENTS	**7 RECONFIGURE**	**8 GENERAL TESTS**	**9 TEL. UNIT**
61 MODEM TEST 62 DTFM TEST 63 OUTPUT LEVEL 64 FREQUECY CHECK 65 FACTORY ADJ. 66 SCANNER ADJ. 67 PRINT SCANREF 68 RINGER TEST	71 SYSTEM REPORT 72 SERV. REPORT 73 SET BITSWITCH 74 NCU PARAMETER 75 CHANGE MEMORY 76 PRINT MEMORY	81 RAM TEST 82 KEY TEST 83 LED TEST 84 LCD TEST 85 SPEAKER TEST 86 PRINTER TEST 87 FLASH 88 ADF TEST 89 PICKUP TEST	91LIU PARAM 92 TONE PARAM 93 CHG EPROM 97 UNIT TEST EFW 98 SET FCU 99 ENGINE PARAM

CURRENT SETTINGS

```
YOUR NAME:          SERVICE
YOUR TEL. NO:       12345
CONFIGURATION:      SERIAL
DIAL MODE:          TONE
PABX:               YES
DAY:                FAX: QUICK
                    TOTAL RINGS: 8 TOLLFREE RINGS: 1
NIGHT:              FAX: QUIET
                    TOTAL RINGS: 5 TOLLFREE RINGS: 0
TIMER DELAY:        06:00-22:00
EASY LINK:          FAX RECEPT:    *5
                    TRANSFER:      *0
                    REL. LINE:     **
ROM VERSION:        V 1.47 1A AT
```

Example for the Function list TAM model :

FUNCTION LIST

1 SET UP	2 FAX	3 FAXSWITCH	4 OTHERS	5 ANSWERING DEV.
11 SET LANGUAGE 12 TIME/DATE 13 YOUR TEL. NO. 14 YOUR NAME 15 DIAL MODE 16 STORE NUMBERS	21 SLOW (4800) 22 POLLED REC: 23 POLLING SEND 24 SEND LATER 25 SIZE COMPR:	31 DAY 32 NIGHT 33 TIMER 34 EASY LINK	41 FAX JOURNAL 42 DIALLING LIST 43 TRANSM. REPORT 44 RINGER TYPE 45 SERVICECODE	51 RECORD TIME 52 ACCESS CODE 53 VIP-CODE 54 MEMO MODE 55 FORWARDING
6 ADJUSTMENTS	**7 RECONFIGURE**	**8 GENERAL TESTS**	**9 TEL. UNIT**	
61 MODEM TEST 62 DTFM TEST 63 OUTPUT LEVEL 64 FREQUECY CHECK 65 FACTORY ADJ. 66 SCANNER ADJ. 67 PRINT SCANREF 68 RINGER TEST	71 SYSTEM REPORT 72 SERV. REPORT 73 SET BITSWITCH 74 NCU PARAMETER 75 CHANGE MEMORY 76 PRINT MEMORY	81 RAM TEST 82 KEY TEST 83 LED TEST 84 LCD TEST 85 SPEAKER TEST 86 PRINTER TEST 87 FLASH 88 ADF TEST 89 PICKUP TEST	91LIU PARAM 92 TONE PARAM 93 CHG EPROM 97 UNIT TEST EFW 98 SET FCU 99 ENGINE PARAM	

CURRENT SETTINGS

```
YOUR NAME:          SERVICE
YOUR TEL. NO:       12345
CONFIGURATION:      SERIAL
DIAL MODE:          TONE
PABX:               YES
DAY:                FAX: QUICK      TAM: ON/LOUD
                    TOTAL RINGS: 5 TOLLFREE RINGS: 1
NIGHT:              TAM: RING 3
                    TOTAL RINGS: 3 TOLLFREE RINGS: 0
TIMER DELAY:        06:00-22:00
EASY LINK:          FAX RECEPT:    *5
                    TRANSFER:      *0
                    REL. LINE:     **
ROM VERSION:        V 1.54 2A AT
```

4.2 COMPONENTS

4.2.1 User and Service functions

USER FUNCTIONS

- Instalation (Help Key is also use for quick Install)
- Fax
- Active Fax Switch
- Others
- Answering device

NOTE: Funtions are grouped in a logical operation way.
Press the FUNCTION key twice and OK to print out the User Functions.

THE SERVICE FUNCTIONS CONTAINS THE CHAPTERS:

- Adjustments
- Reconfigure
- General tests
- Tel. unit

NOTE: Enter in the Service Mode, then press the FUNCTION key twice, then OK to print out the Service Functions
In this mode, you get a complete overview from all the functions.

4.2.2 Current settings

For a prompt survey of all important informations there is add a Current settings list under the Function list.

THE CURRENT SETTINGS LIST CONTAINS:

- Your Name: Stored name
- Your Tel Nr.: Stored telephone number
- Configuration: Serial /Parallel
- Dial Mode: Pulse/Tone
- PABX: PABX select - yes/no
- Day: Fax and TAM configuration, Number of Rings and Toll free rings
- Night: TAM - Fax Configration, Number of Rings and Toll free rings
- Timer To set timer for Day and Night operation. Two 12 hour frame.
- Easy Link: Tone selection.. Remote Fax RX *5, Forwarding *0, Release Line **
- ROM Version: Software version, Country code...

5 USER FUNCTIONS

5.1 TABLE OF USER FUNCTIONS

5.1.1 Installation

Nr	Function name	Description
11	Set language	Set 5 differernt languages. Messages and reports will be printed or show in the language you have chosen
12	Time and Date.	The time setting in term of PM and AM time.
13	Your Tel. No.	To be printed in the page header.
14	Your Name	To be printed in the page heather.
15	Dial Mode	Pulse or Tone. PSTN and PABX purpose
16	Store Numbers	To store number to be dialed from memory

5.1.2 Fax

Nr	Function name	Description
21	Slow (4800bps)	Half speed transmission (4800 baud: ON/OFF)
22	Polled reception	To call another station and receive a document.
23	Polling Send	To set later Fax Poll
24	Send later	To set a document to be sent within the next 24 hours Can chose any resolution mode.
25	Size Compr.	to compress the Document RX - 94%

5.1.3 Faxswitch

Nr	Function name	Description - (n.a. in M. Primo)
31	Day	Fax Quick, Normal, Manual or Expert in combination with/without TAM
32	Night	Fax Quiet/Expert in combination with/without TAM
33	Timer	Set up Day and Night time in a 12 hours frame.
34	Easy Link	Fax RX *5, Forwarding *0, Release line **

5.1.4 Others

Nr	Function name	Description
41	Fax Journal.	Print TX/RX report
42	Dialling list	Print numbers stored in memory
43	Trans. Report	Print report after every transmisson.
44	Ringer types	Selection between 4 different ringer types.
45	Service code	Service access codes to erase/change : 7117-Fact. settings, 7140 User settings,... etc

5.1.5 Answering device - 15 min. Rec.

Nr	Function name	Description
51	Record time	Setting for the recording duration of calls 30 /60 / 120sec / AUTO.
52	Access code	To set the code for remote control and for message forwarding.
53	VIP code	Authorised callers can override the answering device.
54	Memo mode	To record a internal or external message.
55	Forwarding	Message forwarded to another telephone number, from the TAM.

6 SERVICE FUNCTIONS

6.1 ENTERING AND EXITING A SERVICE FUNCTION

6.1.1 To enter a service function

1. Press START, STOP,START, STOP.... (for around 4 seconds) until you see an Icon in the most right side of the display.
2. Select the function with the numeric keypad or the keys LEFT and RIGHT and press OK.

6.1.2 To exit a service function

1. Press STOP twice in each function, to go into the standby mode.
   The FUNCTION key toggles between special functions in a group.
2. After timeout (40 sec), the system will switch the service mode off.

NOTE: For service functions the keys LEFT, RIGHT, OK, *, #, START and STOP are used.
For setting of hexadecimal A through F, you must press down and hold the keys 0...5 for around 2-3 seconds

HEX	A	B	C	D	E	F
key	0	1	2	3	4	5

6.2 TABLE OF SERVICE FUNCTIONS

6.2.1 Adjustments

Nr	Function name	Description
61	MODEM test	Permits to send a specified Freq. or baud rate to the tel. line and speaker. (external measuring instrument needed). Used to check if the Modem is working
62	DTMF test	Send a specified DTFM signal to the tel. line. (external measuring instrument needed).
63	Output level	Used to adjust Fax output signal. Country dependant. FACTORY ONLY
64	Frequency check	To generate and output a sine wave with selectable frequency (100 Hz steps) at the defined output level. FACTORY ONLY
65	Factory adjust	1.) To check software and country version. 2.) To set output level using the * / # keys (external measuring instrument needed). 3.) To make a Soft reset: Memory Test and RAM clear
66	Scanner adjust	Used to check the correct function of the LED-array.
67	Print scanner Ref	reference line used to check the CIS.
68	Ringer Test	Test ringer. press stop to end the test.

6.2.2 Reconfigure

Nr	Function name	Description
71	System report	Prints out the current system parameters. Used before changing or replacing FCU.
72	Service report	Prints out the most recent 10 error codes. Used before changing or replacing FCU.
73	Set bitswitch	Used to change bitswitch settings.
74	NCU parameter	Used to adjust parameters for dialling
75	Change memory	Used to check or change the RAM/ROM contents. FACTORY ONLY
76	Print memory	Used to print out a certain memory area. FACTORY ONLY

6.2.3 General tests

Nr	Function name	Description
81	RAM test	To test correct function of RAM. FACTORY ONLY
82	KEY test	To test correct function of all keys.
83	LED test	To test correct function of all LED's.
84	LCD test	To test correct function of the LC-display.
85	Speaker test	To test correct function of built in speaker.
86	Printer test	To test correct function of the thermal head.
87	Ext. Mem Test	EPROM test for TAMless, Flash test for TAM model. FACTORY ONLY
88	ADF test	Used only by the Factory
89	PICKUP Test	Used only by the Factory

6.2.4 Tel. unit

Nr	Function name	Description
91	LIU param	Edit the contents in the LIU-parameters.
92	Tone param	Edit contents in the Tone Parameters. FACTORY ONLY
93	CNG Change	Use only by the Factory
97	Unit Test Menu	Used only for debugging. Factory only.
98	Set FCU	Set factory parameters and clear Flash Memory, change country code etc..
99	Engine param	Edit engine parameters. FACTORY ONLY

6.2.5 EPROM - Installation / Replace

EPROM LABELING

The EPROM is labeled with a Specific Version and for a Specific Type of Model:

- G1: Fax 241 (small Core)
- G1g: Fax 241 (big Core)
- G2: Fax 271 - TAM version. (big Core)

Version: V1.64 **a** - where **a** is the Country Group. (see page 2-17)

Print out the System Report - Function 71, before replacing the EPROM or the FCU.
To replace the EPROM, disconnect the machine from the main Power. Open the Pickup module and remove the Ink Foil. Under the ink foil you find the Software Cover. Slide the cover to the side, and open it. To remove the old EPROM, use an IC Plier.

WARNING !

Do not force the EPROM. Pull even the chip. The EPROM can be damaged if mishandled.

Clean the Scanner and the Scanner Roller. Power up the Fax. Check the Display. A serial of tests will begin to assure that the EPROM has been correctly installed. Scanner Adjust will be tested. To reinitialize used Software, disconnect the machine, press and hold Start and * keys and connect the machine again.

INITIALIZATION PROCESS -

Ext. Memory (5 sec)
Test (10 sec)

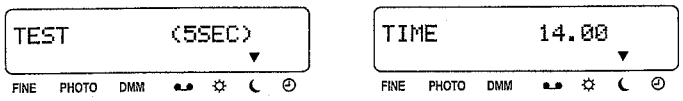
The following tests will be displayed under Test Mode (press STOP after each test). Some steps might change due to SW version.

- OLC- UK Test 1
- Ext. Tel.
- Fax SW 1
- AC Acoustic
- PSTN/PABX
- Conf. CNTRY
- PMO Test (PD - Scan Ref. come shortly)

Open Cover ... press stop ...

Then, appear the "Printing" command. Is not necessary to print out the Tests. If the Set has reached this status without failures, then DISCONNECT the Set from the main Power for around 5 seconds. Connect again.

On the display you will see:

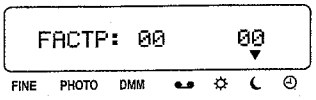


SET COUNTY CODE

Now, the EPROM has been checked and accepted.
To program Country after replacing EPROM or FCU, or if the set remains in version UT. (only english language is available)

1. Enter Function 98

   The LCD shows:



   First 2 digits = Factory byte address/Second 2 digits = Country Code

2. Press 01 for the address, then Start. Then country code 0B, 0C, 07..etc (see table page 2-16) press OK.
   A Test will run, then set Time and date.

6.2.6 SERVICE CODE - Function 45

The service code is define as a code which consists of a maximum of 7 length digits with an additional digit as checksum. The service codes are usually used by the Service Technician or the Help Desk.

1. Enter Funtion 45.
2. Enter the code as needed.

See Table and Formats:

NCU settings:	TAAPPPC
BSW settings:	TAABC
Aditional Parameters:	TSAAPPPC
System Specific Settings:	TNNC

T:	Type of parameter
AA:	Address number
PPP:	Parameter it self(3digits)
C:	Chechsum
B:	Specifies the bit number.
S:	Subgroup 1=Set tone detection, 2=set LIU, 3=Set factory information.
NN:	Serv. No.

TYPE OF PARAMETER

1 Set NCU parameters 00-99
2 Set NCU parameters 100-199
3 Set BSW bitswitches
4 Clear BSW bitswitches
5 Toggle BSW bitswitches
6 Set additional Param.. LIU and Factory info
7 System Specific Settings
8 Reserved
9 Reserved

SERVICE NUMBERS

10 System Reset-Complete-Factory tests and defaults
11 System Reset-Complete-Factory defaults
12 Clear Phone Book
13 Clear TAM contents
14 Clear user config.reset all except Name- Tel. No.
15 Clear user configuration-reset all
16 Clear Line Interface Configuration
17 Clear Tarif information
18 Clean Printhead
19 Clear OGM1-OGM2-restore pre-recorded OGM´s
20 Clear RAM
21 White reference
22 DMM clear

Example for NCU (type 1 and 2):

Change parameter 7 to 123. Format TAAPPPC.

e.g.:	Set NCU	address NCU	parameter to be changed	checksum	code
	1	07	123	5	1071235

Example for BSW (type 3, 4 ,5):

Set BSW 13/3. Format TAABC

	Set BSW	Address No.	Bit number	Checksum
Code:	3	13	3	5

Example for Additional Parameters (type 6):

1. Set Tone detection param. 8 to 87. Format TSAAPPPC.
2. Set LIU Param. 13 to 45.

	Set addit. Param.	Subgroup	Address No.	Parameters	Checksum
a. Code:	6	1	08	087	7
b. Code:	6	2	13	045	3

Example for System Specific Settings:

Erase modifications to factory settings. Format TNNC

	Syst. Spec. Settings	Service Number	Checksum
Code:	7	11	7

Checksum is the residuous from the initial code digit Format divided by Modulo 11.
Ex. 711(TNN) : 11 = 64,6 residual 7 or in a scientific calculator 711 - MOD - Enter = 7

Summary from usual Service Codes:

7106: System Reset (reset all)
7139: Clear TAM
7161: Clear LIU
7216: White Reference (new ref!)
7117: Restore Factory default
7140: Clear User Configuration
7194: Restore pre-recorded OGM
7227: DMM Clear
7128: Clear Phone Book
7150: Clear conf. (tel-name included)
7205: RAM clear

6.3 DETAILED DESCRIPTION - SERVICE FUNCTIONS

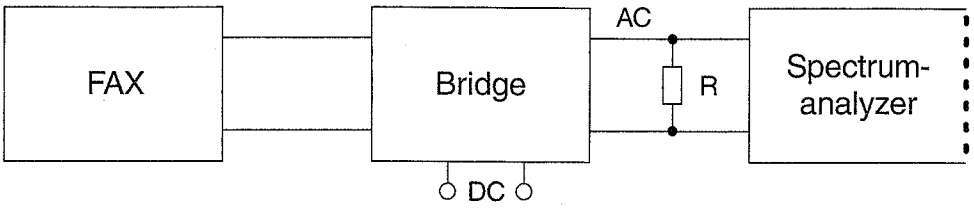
6.3.1 Adjustments

MODEM TEST - FUNCTION 61 - FACTORY ONLY

This function permits to send a specified frequency or baudrate to the telephone line for measuring purposes (9600,7200,4800,2400,300 Bps). Used to test if the Modem is working if problems at RX/TX

1. Enter the service function
   The machine goes on the line.
2. By pressing one of the keys (* and #) the user can define which signal is output by the modem chip.
   The LCD shows the specified frequency or baudrate.

Blockdiagram for the measurements of functions 61-64



The value of R is depending on the spectrumanalyzer.

DTMF TEST - FUNCTION 62

This function permits to send a specified DTMF signal to the telephone line for measuring purposes.

1. Enter the service function
2. By pressing one of the numeric keypad (0-9,* and #) the user can define which DTMF signal will be sent out to the telephone line. The DTMF signal is also sent to the speaker.
   To dispatch a continuous DTMF tone, the DTMF continuous mode bit in LIU PARAM. must be set (tone is sent as long as key pressed). Switch the machine OFF/ON, to activate the new function.

OUTPUT LEVEL - FUNCTION 63 - FACTORY ONLY

This function permits to change and define the output level for sending signals CNG, CED, FSK (300bdp) and high speed pixel data to avoid a telephone line problem.

1. Enter the service function
2. By pressing one of the keys (* and #) the user can define the output level (in 1dB steps),
   it is also shown on the right corner of the LCD and is stored immediately. (Range: 0dB ... - 15dB).
3. Options available under this setting are Coarse, Fax, Tone (TAM-TAMless)
   TAM, TAM Audio, Hands Free (TAM model)

NOTE: The real range for the output level depends on PTT requirements for each country.

FREQUENCY CHECK - FUNCTION 64 - FACTORY ONLY

This function permits to send a definable frequency to the telephone line and the speaker.
The frequencies can be set in 100 Hz steps with a defined output level.

1. Enter the service function
2. Press LEFT to select send.
   With * and # the user can define the sending frequency with the specified output level.
3. Press RIGHT to select receive.
   Receive tests which digital filters are active.

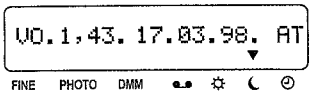
FACTORY ADJUST - FUNCTION 65

This function consists of two levels. The first level gives SW-informations about the version number, creation date and country code. The second level permits to set the correction value for the OUTPUT LEVEL or to make a RAM CLEAR if necessary.

NOTE: Make a print out of the system report (service function 71) and the dialling list (user function 52) before doing a RAM clear.

1. Enter the service function

   The LCD shows:

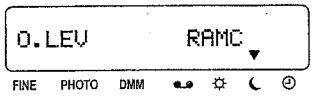


X = Software version
D = Day*
M = Month*
Y = Year*
C = Country (eg. AT: Austria, DE Germany, S: Sweden etc)

*(generated date of SW)

2. Press Start

   The LCD shows:



3. Press LEFT to select "Output Level"
   With * and # the user is able to adjust the correction value for the output level (range from 1..255).
4. Press RIGHT to select "RAM Clear"

   The LCD shows:

   If START key is pressed, a soft reset is performed, which includes a Whole memory test and a RAM clear.

SCANNER ADJUST - FUNCTION 66

Use this function to check the correct functioning of the scanner LED array.

1. Enter the service function
   The CIS-LED array is on.
2. Press STOP - the CIS-LED array is off.

PRINT SCANNER REFERENCE LINE - FUNCTION 67

Use this function to check the CIS via print out of the scanner reference line. The reference line is a diagram of the values which are used for the auto shading correction. If the line comes close to the top level or if there are significant peaks it indicates problems with the CIS. Please follow this procedure, before you change the CIS:

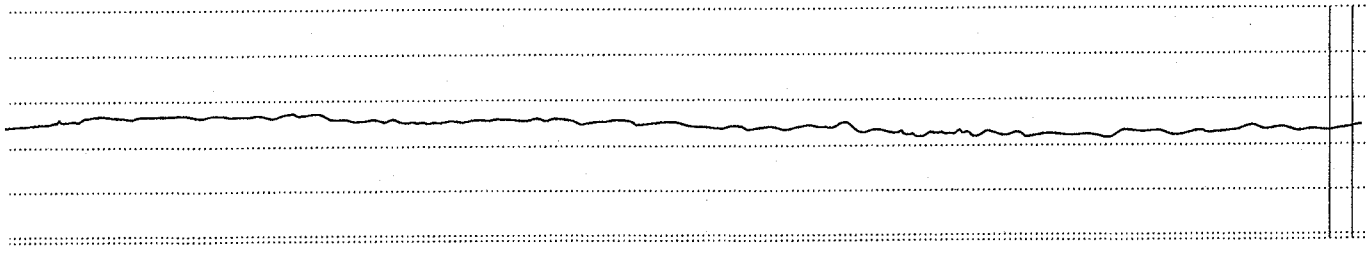
1. Enter in Service Mode (Start..Stop..) Function 67 - Print Scan Ref... OK. This is the original Factory Adjustment.

2. You are in Service mode...Function 05 - Scan Ref Analysis. This is the actual value scanned against the Scann Roller, though, is a temporary value. Compare both References, the Factory Ref and the Temporary Ref.

3. If the Factrory Adj. present defects, and the temporary value looks fine, we can proceed to use Function 45 code 7216. This new value will be stored in memory.
   If the Temporary Scan Analysis present defects, but the Factory Adj. looks fine, proceed to power Off / On the machine. (disconnect from Ithe mains)

4 Take in account that the CIS and the Scan Roller have to be clean, in order to obtain a good reference.

Example for Scanner reference line. Spikes or drastic drops mean a possible defect. Clean the CIS, and try again.



If a bad Scan-Ref is obtained, you have to find the cause of the problem (dust, dirt, corrector, defected CIS or Roller..etc). Clean or Repair the Scanner if necessary. If the reference line is not in the middle, but shifted slidly up or down, this will not be taken as an error, as long as the Ref. Line it self is as shown. It is recomended to make a copy in Photo Mode to test the results.

RINGER TEST - FUNCTION 68

Use this function to check the ring of the ax machine.

1. Enter the service function.
2. Enter the Function. Press OK
   You will hear a continuous ring
3. Press the STOP-key to finish this function. The changing value is accepted.

6.3.2 Reconfigure

SYSTEM REPORT - FUNCTION 71

Use this function to print the actual system parameters like TTI, CSI, ROM/LIU-Version, CCITT number, Maker code, Country Version, Bit switches and NCU parameters.
If possible, print out this list before repairing or replacing the FCU and before refilling the system parameters.

Enter the service function.
The system report list will be printed now.
Page 1 shows BSW and NCU parameters list, and Page 2 the second part of NCU and LIU Parameters.

Example for a System report:

SYSTEM REPORT 02-JUN-98 13:47

```
YOUR NAME:
YOUR TEL. NO.:
ROM VERSION:        V1.54 2A G2MV 16.04.98 17:37 AT 020 01 FA4 006
CCITT/MAKER:        A/1
OUTPUT LEVEL:       -10DBM
FACTORY INFO:       X00 X10 XFF XFF XFF XFF XFF XFF

BITSWITCH   DEFAULT   ACTUAL     BITSWITCH   DEFAULT   ACTUAL
       00  10110000   10110000          04  01111111   01111111
       01  00000001   00000101          05  01010000   01010000
       02  01100010   01100010          06  11100001   11100001
       03  01100100   01100100          07  11000000   11000000

NCU PARAM.  DEFAULT   ACTUAL     NCU PARAM.  DEFAULT   ACTUAL
       00    042/2A   042/2A            34    000/00   000/00
       01    030/1E   030/1E            35    015/0F   015/0F
       02    018/12   018/12            36    060/3C   060/3C
```

Line "ROM VERSION" means:

e.g.:	SW-Version	SW	Date (SW)	Time	LIU-Country	OPU-configuration	Factory code	ARAM-amount	LIU-code
	V1.54	2A G2MV	02.06.98	17:37	AT	020	01	FA4	006

Line "CCITT/MAKER" means:

		Output Level
e.g.:	A/1 made in Austria	-10DDM

Factory Info

at the moment only the country setting (2nd positon-X10 - is used. See table in page 2-16 to check country code.
All other parameters are reserved for future use.

Columns "BITSWITCH / NCU PARAM" means:

e.g.:	Bitswitch Nr.	Default value	Actual value
	00	00000010	00000010

e.g.:	NCU Parameter Nr.	Default value	Actual value
	Dec/Hex	Dec/Hex	Dec/Hex
	0/00	42/2A	42/2A

SERVICE REPORT - FUNCTION 72

Print the most recent 10 error codes, and gives the informationon the 5 most recent communications that experienced errors.

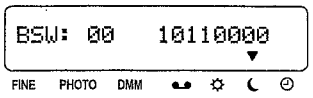
SET BITSWITCH - FUNCTION 73 - ONLY FOR FACTORY PURPOSES

Use this function to change a bit in the config bitswitch area.

WARNING !

Do not change a bit switch that is described as "Not used", as this may cause the machine to malfunction or to operate in a manner that is not accepted by local regulations.

1. Enter the service function

   The LCD shows: 

   (cursor blinks under NN)

   NN BSW-adress, starts with 00 (HEX)
   XXXXXXXX Value field; each X stands for a single bit of setting (0=not set, 1=set)

2. Enter the required BSW-adress via the numeric keypad and the R-key with the numeric keys 0 - 5 simultaneous for A - F to change the address field (all input values are hexadecimal).
   It's also possible to in/decrement the address with "*" or "#".

3. Press START to move from address field to value field.

4. To change a certain bit use the numeric keypad - just type its position number now

bit-number:	7	6	5	4	3	2	1	0
position	x	x	x	x	x	x	x	x

   eg.: BSW 07: 0 1 0 1 0 1 0 1 -> Bits 6,4,2,0 are set to 1are set to 1.

   NOTE: If the bit was initially (before setting) "1", it's now "0" and vice versa.

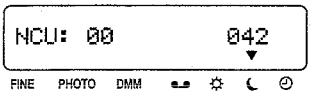
5. Press START to switch back to address field.

6. Press OK to exit this function, followed by STOP.

NCU PARAMETER - FUNCTION 74 - ONLY FOR FACTORY PURPOSES

Use this function to adjust parameters for timing detection and dialling.
The NCU parameters are in the following chapter.

1. Enter the service function.

   The LCD shows: 

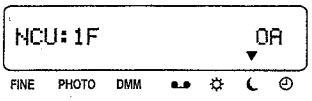
   (cursor blinks under 00)

   NN NCU-adress, starts with 00 (HEX)
   XXX Decimal value setting of NCU parameter NN

2. Enter the required NCU parameter-adress via the numeric keypad and the R-key with the numeric keys 0 - 5 simultaneous for A - F to change the address field (all input values are hexadecimal).
   It's also possible to in/decrement the address with "*" or "#".

3. Press START to move from address field to value field.

4. Change the desired value (DEC) via the numeric keypad

   e.g.: 

   -> NCU 1F is set to value 10 (DEC)

5. Press LEFT or RIGHT to correct wrong Data entries.

6. Press START to switch back to address field.

   NOTE: Changing the value is immediately accepted, no way return to previous if mistyped!

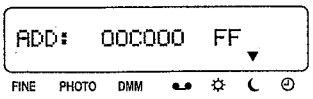
7. Press OK to exit this function, followed by STOP.

CHANGE MEMORY - FUNCTION 75. ONLY FACTORY USE

Use this function to check the ROM/RAM and change the RAM contents.
The RAM addresses are listed

WARNING!

The user must be well aware of the meaning of these locations before making any change in RAM!
This may cause the machine to malfunction.

1. Enter the service function
2. The LCD shows: 

(cursor blinks under NNNN)

NNNN	Memory address (HEX)
XX	Memory data (HEX)

3. Use LEFT and RIGHT to control the cursor.
4. Press START to switch over from the address to the data field.
5. With the keys 0 - 9 on the numeric keypad and the R-key with the numeric keys 0 - 5 simultaneous for A - F the address and data field can be changed (all input values are hexadecimal).
6. With the * and # keys on the numeric keypad the address can be increased or decreased.

   NOTE: Changing the data is immediately accepted, no way return to previous if mistyped!
7. Press OK to finish this function.

PRINT MEMORY - FUNCTION 76-FACTORY ONLY

Use this function to printout a certain memory area.

1. Enter the service function.
2. Enter the start address or accept the given range and press OK.
3. With the keys 0 - 9 on the numeric keypad and the R-key with the numeric keys 0 - 5 simultaneous for A - F the address field can be changed (all input values are hexadecimal).
4. With the * and # keys on the numeric keypad the address can be increased or decreased.
5. Enter the end address or accept the given range and press OK. A print out of the selected area will be made.

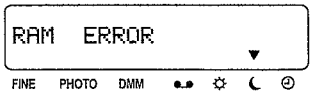
Example for a Memory-print out

```
E000 : DF  FF  FF  FF  FF  FF  FF  FF    FF  FF  FF  FF  FF  FF  FF  FF
E010 : FF  FF  FF  FF  FF  FF  FF  FF    FF  FF  FF  FF  FF  FF  FF  FF
E020 : FF  FF  FF  FF  FF  FF  FF  FF    FF  FF  FF  FF  FF  FF  FF  FF
E030 : FF  FF  FF  FF  FF  FF  FF  FF    FF  FF  FF  FF  FF  FF  FF  FF
E040 : FF  A0  03  69  50  35  3C  31    73  61  28  93  0F  00  00  00    .IP5 1SA ( ....
E050 : 00  01  00  0C  69  B0  59  35    1B  A4  3D  1D  72  69  69  9F    ....I Y5.Ñ=.RI
E060 : 00  00  00  01  01  8D  C0  D0    59  35  1B  A4  3D  1D  72  69    ..... |  Y5.Ñ=.RI
E070 : 69  9F  00  00  00  01  00  8C    D9  D1  59  35  1B  A4  3D  1D    I .....  | Y5.Ñ=.
E080 : 72  69  69  9F  00  00  00  01    00  8C  5F  BC  5A  35  1B  A4    RII .....  Z5.Ñ
E090 : 3D  1D  72  69  69  9F  00  00    00  01  00  8C  B5  EA  5A  35    =.RII .....  Z5
E0A0 : 3C  31  D4  0D  27  34  71  0F    00  00  00  01  00  8C  B7  12     1 .'4G......
E0B0 : 5B  35  1B  A4  3D  1D  72  69    69  9F  00  00  00  01  00  8C    [5.Ñ=.RII .....
E0C0 : 07  13  5B  35  1B  A4  3D  1D    72  69  69  9F  00  00  00  01    ..[5.Ñ=.RII ....
E0D0 : 00  8C  77  13  5B  35  1B  A4    3D  1D  72  69  69  9F  00  00    . W.[5.Ñ=.RII ..
E0E0 : 00  01  00  8C  16  67  5C  35    3C  01  40  70  83  51  FF  9F    ... .G 5 . P Q
E0F0 : 00  00  00  01  00  8C  FF  FF    00  10  FF  FF  FF  FF  FF  FF    .....  ..
```

6.3.3 General tests

RAM TEST - FUNCTION 81 - FACTORY ONLY

Use this function to do a RAM TEST, after the test the result will be returned.

1. Enter the service function
   The RAM is tested by writing 55h to RAM, shift left 1 bit and check with AAh if it is correct or not.
   The test does not destroy the contents of the RAM.
2. Check the LC-display:
   If an error occurs the display shows 

   is displayed for 3 seconds and the message "RAM TEST ERROR" is printed. If no error is found, the message "RAM TEST OK" is printed.

KEY TEST - FUNCTION 82

Use this function to do a KEY TEST, after the test the result will be returned.

1. Enter the service function
2. Press the keys of the control panel in a certain sequence.
   The LCD indicates the key to be depressed.
   The test is finished when the last key (the "START" key) is pressed. If all keys have been pressed correctly, the message "KEY TEST OK" is printed, otherwise the message "KEY TEST ERROR" is printed.

LED TEST - FUNCTION 83

Use this function to do a LED TEST, after the test the result will be returned.

1. Enter the service function
   All the icons of the LCD and the LED on the control panel are flashing in turns.
2. Check if the LED and all icons are OK.
3. If all LED's are working correctly press "START", the message "LED TEST OK" is printed.
4. If one of the LED's is defective press "STOP", the message "LED TEST ERROR" is printed.

LCD TEST - FUNCTION 84

Use this function to do a LCD TEST, after the test the result will be returned.

1. Enter the service function
   The LCD should display a black pattern alternating.
2. Check if all the dots of the LCD are switched on and off.
3. Press "START", if all dots are correct the message "LCD TEST OK" is printed.
4. Press "STOP" if one of the dots is defective, the message "LCD TEST ERROR" is printed.

SPEAKER TEST - FUNCTION 85

Use this function to do a SPEAKER TEST, after the test the result will be returned.

1. Enter the service function
   Now the speaker sounds.
2. Press "STOP" if the result is bad, the message "SPEAKER TEST ERROR" is printed.
3. Press "START" if the result is correct, the message "SPEAKER TEST OK" is printed.

PRINTER TEST - FUNCTION 86

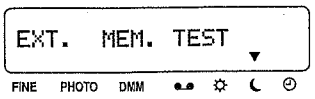
Use this function to print a test pattern for checking the result.

1. Enter the service function
   Vertical and horizontal lines will be printed.

EXTENDED MEMORY TEST - FUNCTION 87 - FACTORY ONLY

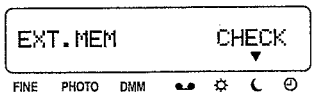
This function permitts to check; print or clear the contents of the AS-FLASH storage.

1. Enter the service function

The display shows: 

press OK

2. Press LEFT or RIGHT to choose Check, Print or Clear the FLASH contents

The display shows: 

CHECK: Do a check of the directory and the data pointed from directory entrys. By pressing OK, the validation check is done and a **long beep** sounds if the check was **invalid**. That means the directory structure and the data pointed to are invalid. This function can be used after any action with flash.

CLEAR: Do a whole clear of the FLASH chip. By pressing OK, the whole contents of the FLASH chip will be cleared and the directory structure and variables which are used for the FLASH are reinitialized. After that action a system reset is performed to garanty a correct initialization and working of the application.

PRINT: Print out of the contents from the entered block.

ADF TEST - FUNCTION 88 - ONLY FOR FACTORY USE. NOT AVAILABLE IN NEW VERSIONS.

This specific function is not available in new Software versions. In some Old versions is present, though the mechanical test is ONLY for production purposes. The copy operation asures the functionability of the Scanner and pickup Modules.

PICK UP TEST - FUNCTION 89 - ONLY FOR FACTORY USE. NOT AVAILABLE IN NEW VERSIONS

This specific function is not available in new Software versions. In some Old versions is present, though the mechanical test is ONLY for production purposes. The copy operation asures the functionability of the Scanner and pickup Modules.

6.3.4 Tel. unit

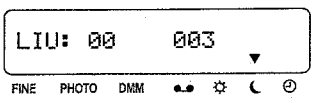
LIU PARAMETER - FUNCTION 91 - FACTORY ONLY

The following specifies the functionality of the LIU-parameters.

1. Enter the service mode

The LCD shows:

2. Press LEFT or RIGHT and OK to print the settings.
3. Press OK to edit the settings.

The LCD shows: 

(cursor blinks under NN)

NN	LIU address (HEX)
XXX	LIU data (DEC)

4. Select the start address with '*' and '#' or the numeric keypad and press 'START'.
5. Edit the data with the numeric keypad.
6. Press LEFT or RIGHT to control the cursor.
7. Press START to select the next address.
8. Press STOP to save and leave function 91.

Example for a LIU-Parameter print out: Not possible to print under this option. See System Report-Page 2

LIU PARAM.	DEFAULT	ACTUAL
00	003/03	003/03
01	002/02	002/02
02	085/55	085/55
03	101/0A	101/0A
04	020/14	020/14
05	101/0A	101/0A
06	011/0B	011/0B
07	085/55	085/55
08	085/55	085/55
09	034/22	034/22

LIU PARAM.	DEFAULT	ACTUAL
0A	070/46	070/46
0B	020/14	020/14
0C	060/3C	060/3C
0D	000/00	000/00
0E	001/01	001/01
0F	001/01	001/01
10	000/00	000/00
11	048/30	048/30
12	025/19	025/19

e.g.:	LIU Parameter Nr. Dec/Hex	Default value Dec/Hex	Actual value Dec/Hex
	00	003/03	003/03

LIU - address HEX 00

Address HEX 00 defines the DIAL MODE REGISTER

Bit Nr.:	7 6 5 4 3 2 1 0
e.g. BIN:	0 0 0 0 0 0 1 1 = Data 03 (DEC)

Bit Nr.	Function	Set	Description
0	dial mode:	0 1	PULSE DTMF
1+2	ground status	1	0: Earth 1: Flash (always Flash)
3	extended dialing	0 1	normal dialing: 0-9, *,#,RECALL, rest not used extended dialing: 0-9,*,#,A,B,C,D
4+5	not used		
6	DTMF-mode	0 1	tone timed tone as long as key pressed (the tone on time is as long as the specific key is pressed but it has a minimum time which is the same like DTMF-mode is 0.)
7	MSG-mode	 0 1	If pulse dial is selected and '*' or '#' will be pressed then dialmode will be switched to DTMF. Inactive: '*' or '#' will not dialed out - a pause will be made. It's not possible to switch back to pulse dialing. Active: '*', '#' or 'R' will be dialed out after the last interdigit pause has been performed. By pressing the R-key it's possible to switch back to pulse dialing (after DTMF has been finished).

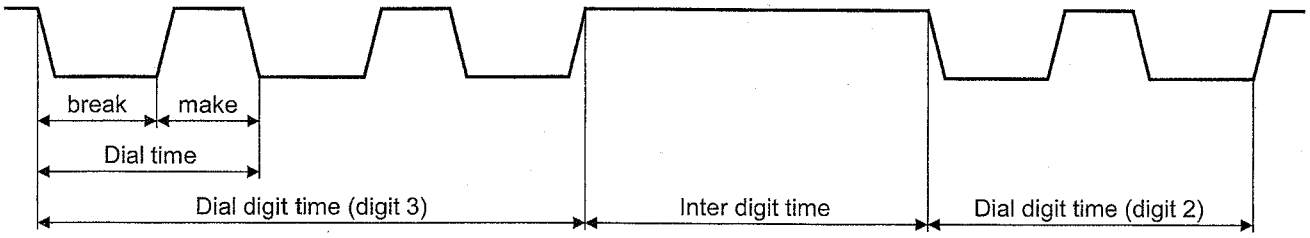
Switching from pulse dial mode to DTMF: Switching from pulse to DTMF dialling will be done by pressing the digit '*' or '#'. If bit 7 of the dial mode register is set the digit will be dialed out otherwise a pause is made and the dialmode will be switched (access pause time).

Switching from DTMF mode to pulse dial: Switching from DTMF to pulse is only possible if dial mode has first been switched from pulse to DTMF and bit 7 of the dialmode-register is set.
The controller switches back to pulse after flash has been processed.

LIU - address HEX 01- TONE mode is a Factory default setting

Address HEX 01 defines the PULSE MODE.

General: Pulse Dial is performed by disconnecting and reconnecting the line in a defined way.
A number is represented by a number of digits. Each digit is represented by a number of disconnections according the number to dial. Any 'Break' (calling the disconnection) is followed by a 'Make' (a re-connection)
until the complete digit is dialed.
Between two digits a pause is neccessary (inter-digit delay) before the next digit is ready to dial.



The timing relationship consists of two dial speeds calleds PPS (**P**ulse **P**er **S**econd):

10PPS and 20PPS (each part of a digit is dialed in 100ms or 50ms)
Additional an off/on+off ratio (break ratio) can be choosen

PPS	break ratio (%)	break (ms)	make (ms)	dial time (ms)
10	60	60	40	100
10	66	66	33	100
20	60	40	20	50
20	66	34	17	50

e.g.:	Bit Nr.:	7	6	5	4	3	2	1	0	
	BIN	0	0	0	0	0	0	1	0	=> Data 2
	BIN	0	0	0	0	0	0	1	1	=> Data 3

Bit Nr.	Function	Set	Description	
0	Dialing Speed	0	10 PPS	
		1	20 PPS	
1	Break/Make Ratio %		**10 PPS**	**20 PPS**
		0	60/40	40/20
		1	66/33	34/17

LIU - address HEX 02 to 0F

Addr. (HEX)	Function	Value	Divide value by	Description
02	Inter digit time (delay)	10...2550ms	10ms	see fig.1
03	Flash time	10...2550ms	10ms	
04	Access pause time	100...6500ms	100ms	
05	DTMF level high	-2...-15dbm	-1dbm	
06	DTMF level difference	-4...+4dbm	0,1dbm	*)
07	DTMF on/off	3...255ms	1ms	
08	DTMF off	3...255ms	1ms	
09	Min detected ring frequency	10...100Hz	1Hz	
0A	Pulse Break	60	-	Typical factory setting
0B	Ring Min. Freq.	60	-	"
0C	Ring MaxFreq.	65	-	"
0D	PABX DIFF	00	-	"
0E	Country Code	016	Decimal	"
0F	**Country Back up**	**016**	**Decimal**	"

Under address 0E, the country value is decimal. eg. Austria 016, Germany 011 etc. If you change the country code, please be aware that the machine will recocgnize the language being set, and Function 11 - language setting will be not possible.
The machines have specific settings per group of countries, take this in account when changing the Country Code.

Country Code Group. HEX Codes full compatible with the Decimal codes from LIU address 0E. (e.g. HEX 10 = Dec 16)

Country	A	B	C	D
Austria	10			
UK	01			
Belgium		0F		
France	0C			
Germany	0B			
Int(ernational)				1F
Italy (Greece)		08		
Switzerland		02		
Netherland		07		
Sweden			03	
Portugal				05
United Kingdom	01			
Norway			06	
Denmark			0E	
Findland			0D	
Spain				04

To change the country code with this Table, use Funtion 98.

1. Enter service mode (Start-Stop-Start-Stop.....)
2. Enter Funtion 98, press OK. Enter Address 01 press Start. enter Country code.HEX value. Press OK. This address is a factory address and NOT a FCU or LIU address. Is a Default Factory Setting. Be sure to programm the right country for the SW.

TONE PARAMETERTEST - FUNCTION 92

This function is used to edit contents in the TONE PARAM. Define address range is 0....38 Hex.

UNIT TEST MENU - FUNCTION 97

Only used for Debbuging. Only info.

SET FCU - FUNCTION 98

To set factory parameters. This parameters are described for the Final Unit Test SW-requirements.

ENGINE PARAMETERS - FUNCTION 99

This function is to edit contents of the Engine Parameters. Only info.

6.4 TABLE OF BSW AND NCU-PARAMETER

6.4.1 BSW listing

The bitswitches are the 1-bit sytem parameters that determine the machine's behaviour.

For HEX codes, press long the keys 0 though 5: 0=A 1=B 2=C 3=D 4=E 5=F

The settings of the switches are: 1 = ON 0 = OFF

GENERAL

	BSW	Bit	BSW Name	Description
	00	0	BSW_PSTN_DIALTONE	PSTN dialtone detection
	00	1	BSW_PABX_DIALTONE	PABX dial tone detection
	00	2	BSW_BUSY_DETECT	Busy tone detection in TAM mode and during dialling
	00	3	BSW_LOOP_CURRENT	Loop current detection
	00	4	BSW_COUNTRY_DIALTONE	Country dial tone detection (see NCU parameter 09 and 0A
	00	5	BSW_INT_DIALTONE	International dial tone detection
	00	6	BSW_PARALLEL_PHONE	state, if parallel phone is used
	00	7	BSW_GRANDMOTHER	Redial only when busy
	01	0	BSW_SPEAKERT30	Speaker operation during T30 handshake
	01	1	BSW_SPEAKERV29	Speaker operation during T30 handshake and V29 operation
	01	2	BSW_PARADISPL	Display of parameters instead of CSI
	01	3	BSW_PAPER_SAVE	reduce received document to half length
	01	4	BSW_JOURNAL	en/disable Journal printout
	01	5	BSW_PABX_MODE	PABX setting possible for user
	01	6	BSW_TXREPORT	Automatic print out of transmission report
	01	7	BSW_KEY_TOUCHTONE	Key press acknowledge tone generation
	02	0	BSW_WAIT_DIAL_DIGITRDY	Special FTZ requirements (18TR53) for Germany
	02	1	BSW_CHOOS_2_FSW_TXT	en/disable alternate messages for user functions
	02	2	BSW_PABX_BUSY_BEFORE_DIAL	BUSY detection BEFORE DIAL (to avoid misdetection of PABX dialtone)
	02	3	BSW_FRENCH_BURNED_NUMBER	After last unsuccessful redial disable start access to a stored number
	02	4	BSW_SEQ_MAX_PAUSE	not used

	BSW	Bit	BSW Name	Description
	02	5	BSW_BUZ_FOLLOW_RING	
	02	6	BSW_LONG_REP	Increases the length of reports (e.g.: error report, transmission report,...)
	02	7	BSW_FULL_REDIAL	Redial of '*' and '#' if set
	03	0	BSW_MERCURY	
	03	1	BSW_SHEETFEEDER	1.. with sheetfeeder
	03	2	BSW_SIZE_COMPRESSION	
	03	3	BSW_DATEMDY	format date display
	03	4	BSW_12CLOCK	clock format is 12h format instead of 24h
	03	5	BSW_MONTHLETTER	Display format of month
	03	6	BSW_COSTCOUNT	Not used
	03	7	BSW_REM_TIMEOUT	TAM remote control TIMEOUT after 50s of remote user DTMF in activity
	04	0	BSW_RDS_FOREVER	RDS TIMEOUT - RDS access is switched off after 24h
	04	1	BSW_SPEECHREC	possibility to record a phone conversation
	04	2	BSW_TAM_DIAL_DET	Dialtone detection in TAM mode (stops recording when detected)
	04	3	BSW_TAM_SPEAKER	Call monitoring during ICM RECORD
	04	4	BSW_TIMESTAMP	TIME STAMP: on, shows date and time of call during ICM playback.
	04	5	BSW_ENABLE_RDS	Possiblity to select REMOTE DIAGNOSTIC for the user
	04	6	BSW_FWD_REDIAL	Redial attempts in FORWARDING mode.
	04	7	BSW_BEEP_OGM2	Beep before OGM2
	05	0	BSW_SLOW_4800BD	slow down baud rate for FAX
	05	1	BSW_PULSE_DIAL_ENABLE	en/disable use of pulse dial features and functions
	05	2	BSW_FSW_FRANCE	special FSW behaviour for FRANCE
	05	3	BSW_PAPFEEDER	en/disable paper feeder
	05	4	BSW_DUMMY0	
	05	5	BSW_DUMMY1	

6.4.2 NCU parameter listing

The NCU parameters are the 1-byte system parameters that determine the machine's behaviour.
They can be modified with function 74.

The adresses are hexadecimal; all values are decimal. Byte numbers are HEX values
The values under "val", are the average values programmed by the Factory. Though are country dependant.

val	Addr	NCU Name	Description
042	00	NCU_WAIT_LOOPCUR	x*100ms: If no loop current within this time, an error condition occurs
030	01	NCU_RING_ON_CONT	x*100ms: after that time RING is continuous
018	02	NCU_FSW_WAIT_OFFHOOK	x*100ms: time between 'end-of-ring' and going off-hook during FSW perations.
050	03	NCU_RING_OFF_MIN	x*10ms: Ring must be OFF for this time to detect end of ring. Set this value higher than pause time of double rings.
005	04	NCU_RING_ON_MIN	x*10ms: ring must be ON for this time to detect start of ring. Set this value lower than the 1st ring pulse of double rings
070	05	NCU_FSW_RING_PAUSE	x*100ms:after this time ring count is cleared. Set time longer than the max pause between 2 rings.
000	06	NCU_INT1_PREFIX	x: int. call seq. can be up to 4 digits (packed in 2 bytes, each byte holds2digits).
255	07	NCU_INT2_PREFIX	x: int. call seq.. can be up to 4 digits (packed in 2 bytes, each byte holds 2 digits).
015	08	NCU_DOM1_PREFIX	x: domestic call sequence can be up to 4 digits (packed in 2 bytes, each byte holds 2 digits).
255	09	NCU_DOM2_PREFIX	x: domestic call sequence can be up to 4 digits (packed in 2 bytes, each byte holds 2 digits).
010	0A	NCU_WAIT_DIAL	x*s: max. wait time-dialtone. If not detected within this time, NO dialtone is isplayed
090	0B	NCU_WAIT_PAUSE	x*100ms: PAUSE-Key time. (old was 20 ms units !!!)
255	0C	NCU_MAX_PAUSE	x*1s: Total delay time allowed for PAUSE-key entries (0=unlimited)
040	0D	NCU_PABX_DELAY	if PABX dialtone detection is disabled (BSW 0 Bit 1), machine waits this time instead of dialtone detection.
040	0E	NCU_PSTN_DELAY	if PSTN dialtone detection is disabled (BSW 0 Bit 0), machine waits this time instead of dialtone detection
004	0F	NCU_MAX_REDIAL	x: max redial attempts to a FAX number including the initial dial.
012	10	NCU_REDIAL_TIME	x*10 s :pause time between automatic redial attempts (valid for FAX send a TAM forwarding mode).
001	11	NCU_FAX_FALLB_COUNT	x: training repeat count after FTT
018	12	NCU_FAX_T1_PLUS	x*1s: added time to the standard T1(35s)wait time for a connect; During fax call the machine waits the resulting time.

val	Byte	NCU Name	Description
010	13	NCU_FAX_ERRLIMIT	x%: error limit value in percent (in lines not set).
000	14	NCU_FAX_CFRGAP	x*10ms: delay between CFR and messahe phase.
043	15	NCU_FAX_RX_ON_LEV	x: input sensitivity ON level (-43dBm)
048	16	NCU_FAX_RX_OFF_LEV	x: input sensitivity OFF level
001	17	NCU_FAX_REC_LENGTH	x: 0..A4, 1..unlimited, 2..(A4,B4)
003	18	NCU_FAX_SCAN_LIN_TIM	x: 3 bits represent T30-DIS bits
001	19	NCU_LANGUAGE_DEF	x: 0..GB, 1..D, 2..DK, 3..E, 4..F, 5..I, 6..N, 7..NL, 8..PO, 9..S, 10..SF, 11..S2, 12..GB2, 13..H, 14..CZ, 15..F2, 16..SK, 17..PL, 18..NL2, 19..I2, 20..N2
000	1A	NCU_LANGUAGE_OPT1	2 nibbles which indicate the language index for AVM
000	1B	NCU_LANGUAGE_OPT2	2 nibbles which indicate the language index for AVM
015	1C	NCU_OGM1_LED_ON_TIME	x*s:after this time has passed OGM1 recording, the "record-LED" starts linking.
006	1D	NCU_OGM1_MIN_LEN	x*s:the minimum time for OGM1,if set to 0 no minimum time is required for a valid OGM1
020	1E	NCU_OGM1_MAX_LEN	x*s:maximum length of OGM1 message
010	1F	NCU_OGM2_MAX_LEN	x*s:maximum length of OGM2 message
008	20	NCU_OGM2_LED_ON_TIME	x*s:after this time has passed during OGM1 recording, the "rec-LED" starts linking.
060	21	NCU_FSW_RB_PAUSE	x*100ms:specifies the pause time for T/F mode between 2 ringback tones.
006	22	NCU_FSW_RB_TYPE	x: Type of ringback tone
000	23	NCU_FSW_RNG_OFFH	x: number of rings before OFFHOOK. In EXPERT: 2 nibbles (NIGHT, DAY)
000	24	NCU_FSW_TIM_OFFH	x*100ms: minimum time before OFFHOOK
050	25	NCU_FSW_TIM_SILENT	x*100ms: time to wait for silent FAX reception
085	26	NCU_FSW_RNG_END	x: number of rings before going to TAM/FAX mode
008	27	NCU_FSW_RNG_TAM_OFF	x*100ms ???????
167	28	NCU_FSW_MODE	x: Current mode: 2 nibbles (NIGHT, DAY)
001	29	NCU_FSW_RNG_QUICK	x: FAX rings in QUICK mode
005	2A	NCU_FSW_RNG_NORM	x: FAX rings in NORMAL mode
005	2B	NCU_FSW_RNG_SMART_L	x: TAM rings in SMART mode, long setting
002	2C	NCU_FSW_RNG_SMART_S	x: TAM rings in SMART mode, short setting
005	2D	NCU_FSW_RNG_TAM_ON	x: TAM rings ON mode
013	2E	NCU_FSW_RNG_NEVER	x: rings before detection phase, MANUAL mode
003	2F	NCU_FSW_RNG_1_4	x: TAM rings in RNG1_4 mode
017	30	NCU_FSW_EXP_TAM	x: TAM mode in EXPERT mode (OFF=0, 2nibbles: MUTE, ON)
034	31	NCU_NIGHT_HOUR	x: hours 0..23 h
000	32	NCU_NIGHT_MIN	x:minute 0..59
006	33	NCU_DAY_HOUR	x: hours 0..23 h
000	34	NCU_DAY_MIN	x:minute 0..59
015	35	NCU_ICM_REC_OPT	x*s:Selectable RECORD TIME (function 41)
060	36	NCU_ICM_MAX_LEN	x*s:reflects the record time value selected with user the function
165	37	NCU_EXT_DTMF	DTMF code for remote control of faxswitch. 8 bits for two DTMF characters.
050	38	NCU_TAM_REM_TIME	x*s:if time passed in TAM remote operation, TAM sends lot of beeps, means user has to prolong ?
200	39	NCU_DELAY_BEF_CED	Delay between ring-detection and sending CED (T30 protocol)
000	3A	NCU_TX_ATT_CORRECT	x*dbm: Modem TX signal output correction attenuation.
000	3B	NCU_TX_ATT_COARSE	x*dbm: Modem TX signal output general attenuation.
015	3C	NCU_TX_ATT_FAX	x*dBm: Modem TX signal output level for FAX.
000	3D	NCU_TX_ATT_TAM	x*dBm: Modem TX signal output level for TAM.
000	3E	NCU_TX_ATT_HFREE	x*dBm: Modem TX signal output level for HANDSFREE.
000	3F	NCU_RINGON_DUPLEX	Ringer on-time for the duplex ringer feature (0=disabled).
000	40	NCU_VOL_CLICK	used for RINGER, KEYKLICK
003	41	NCU_VOL_BUZ	used for RINGER, KEYKLICK
003	42	NCU_VOL_SPK	used for TAM, LINE
255	43	NCU_MEMO_MAX_LEN	x*s:Maximum length of external memo message
255	44	NCU_MEMO_LED_ON_TIME	x*s:Time, after recording led shoud start blinking. Approx. 80% of NCU 59.
255	45	NCU_VER_CHKSUM	hold date checksum
204	46	NCU_ROM_CHKSUM1	hold system checksum High byte
251	47	NCU_ROM_CHKSUM0	hold system checksum Low byte
000	48	NCU_DUMMY0	
000	49	NCU_DUMMY1	
000	4A	NCU_CABLE_EQUALIZER	
000	4B	NCU_RING_TYPE	x: 0..4 Ringer type
165	4C	NCU_REM_FAX_START	x: *5 FAX start
160	4D	NCU_REM_CALL_TRANSFER	x: *0 CALL transfer
170	4E	NCU_REM_ON_HOOK	x: ** ON HOOK
000	4F	NCU_REM_ACC1	x: 00 two nibbles used
000	50	NCU_REM_ACC2	x: 00 two nibbles used
153	51	NCU_REM_VIP1	x: 99 two nibbles used
153	52	NCU_REM_VIP2	x: 99 two nibbles used
030	53	NCU_LOOP_DET_TIME	x*10ms: if stable for that time loop was detected

val	Addr	NCU Name	Description
030	54	NCU_LOOP_LOSS_TIME	x*10ms:
008	55	NCU_CALLTR_DST_RING_CNT	x: number of rings at destination of call transfer
005	56	NCU_CALLTR_SRC_RING_CNT	x: number of rings at source of call transfer
040	57	NCU_CALLTR_RING_INTERVAL	x*100ms: time between starting rings during call transfer
050	58	NCU_CALLTR_TIMEOUT	x*100ms: timeout for dropping handset to start call transfer
val	Addr	LIU Name	Description
003	00	LIU_DMODE	dial mode register
000	01	LIU_PULSE_MODE	pulse dial speed and break/make ratio
085	02	LIU_INTER_DIGIT	in 10 ms inter digit delay
010	03	LIU_FLASH	x*10ms - flash time
020	04	LIU_ACCESS_PAUSE	in 10 ms - access pause time
012	05	LIU_DTMF_LEV_HIGH	in -dbm - level of high frequency
014	06	LIU_DTMF_LEV_LOW	in -dbm - level of low frequency
085	07	LIU_DTMF_ON	in ms - DTMF on time
085	08	LIU_DTMF_OFF	in ms - DTMF off time
040	09	LIU_PULSE_MAKE	in ms - PULSE MAKE time
060	0A	LIU_PULSE_BREAK	in ms - PULSE BREAK time
020	0B	LIU RING MIN FRQ	in Hz - min Ring frequency
060	0C	LIU_RING MAX FRQ	in Hz- max Ring frequency
000	0D	LIU_PABX DIFF	in 0.1 db PABX output level adjustment
011	0E	LIU_COUNTRY_CODE	country code
011	0F	LIU_COUNTRY_BACK	back up of country code
000	10	LIU PABX_FLASH	x*10ms - PABX output level adjustment
048	11	LIU_DMO_MODE	x: country specific DMO mode

III Service

In this Chapter you can find

- *illustrated disassembly*
- *PCB-architecture and descriptions*
- *troubleshooting*
- technical data
- mechanical and electrical parts list
- glossary and index

7 DISASSEMBLY

Warning!
Disconnect the Power from the set before removing any cover!
Remove the ink-foil from the set!

7.1 REAR COVER

7.1.1 Remove rear cover from mech. module

1. Put away the handset, paper tray and Ink Foil. Close again the Pick up Module. Leave the Scanner Module open.
2. Remove the Document Tray. Press carefully the left-snap and pull it up. Remove the 2 screws behind the tray (see fig. 1a).
3. Open the snaps at both sides of the Pick up module. Close if needed OPU.
4. With your finger, open snaps at each side in the inner part. (see fig. 1b) (Screws: 2x torque size 8)
5. Holding the Pick up module remove the Rear cover by pulling towards the back. (see fig. 1c).

fig. 1a

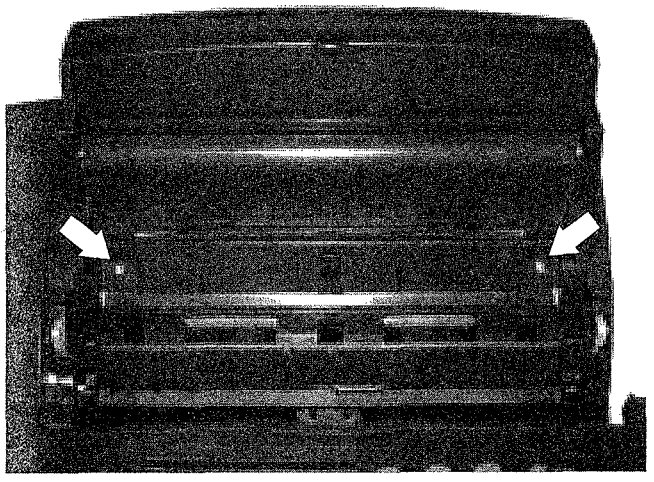
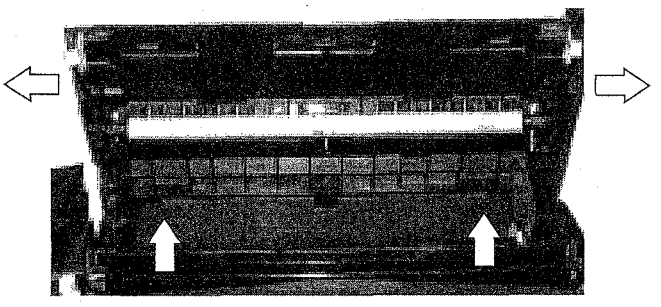


fig. 1b



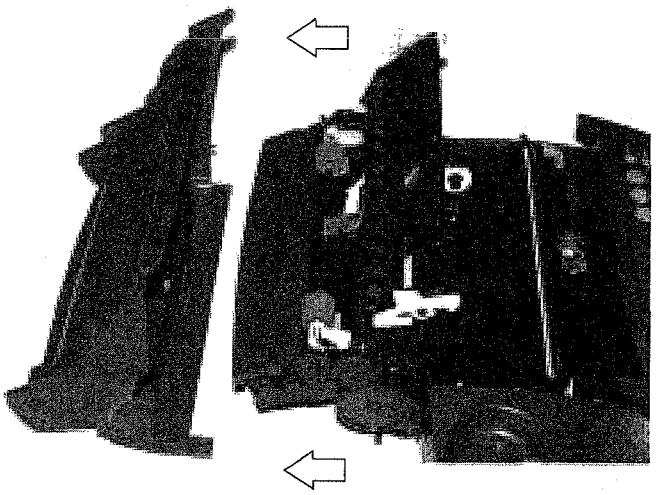


fig. 1c

7.2 OPU

7.2.1 Remove Operational Panel Unit

1. Put away the handset, paper tray
2. Open the OPU. Open the 3 snaps in the inner side (see fig 2a)
3. Disconnect cable. Watch the sensor cable when closing.

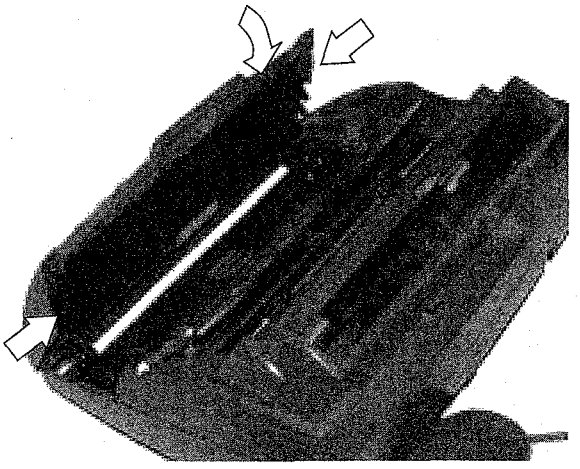


fig. 2a

7.2.2 HANDSET COVER

Remove Handset Cover

1. Put away the handset, paper, trays and Ink Foil
2. Open OPU and Pick up module
3. Remove the 3 screws from the cover. (see fig 3a)
4. Push in the snaps in the back and the side. (see fig. 3b)
5. Lift the handset cover, turn it face up and remove Hook PCB cable (8pins) and Speaker cable (2pins) (see fig 3c.

fig 3b (start here!)

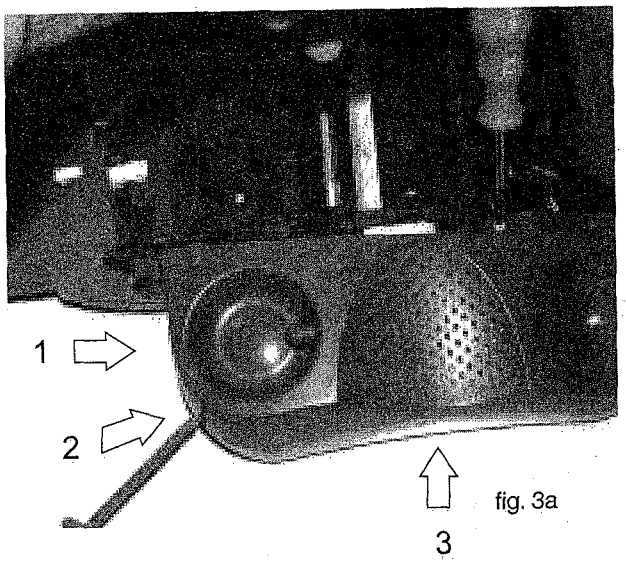


fig. 3a

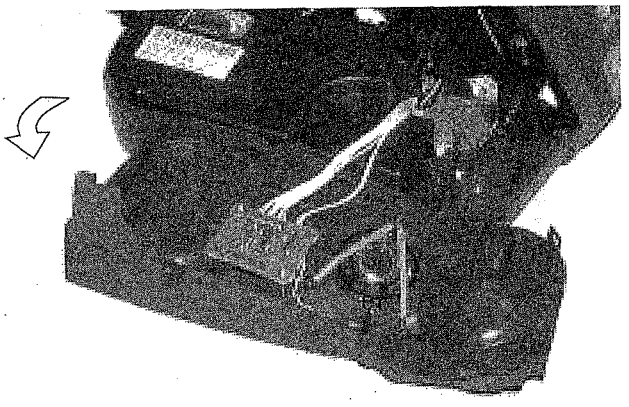


fig. 3c

7.3 PICK UP MODULE + PRINTER MODULE

7.3.1. Remove the Pick up Modules

1. Put away the handset, trays and Ink Foil
2. Open OPU and Pick up module / Printer Module
3. Remove Hanset cover (see section 7.2.2)
4. Remove the 2 screws at the base of the Scanner Module (see fig 4a)
5. Remove the 2 screws at the base of the Pick up Modules
6. Close carefully the Pick up Module. Remove towards the back . (see fig 4b)
7. Disconnect THP, SIF sensor, motor, SSP sensor, door switch.

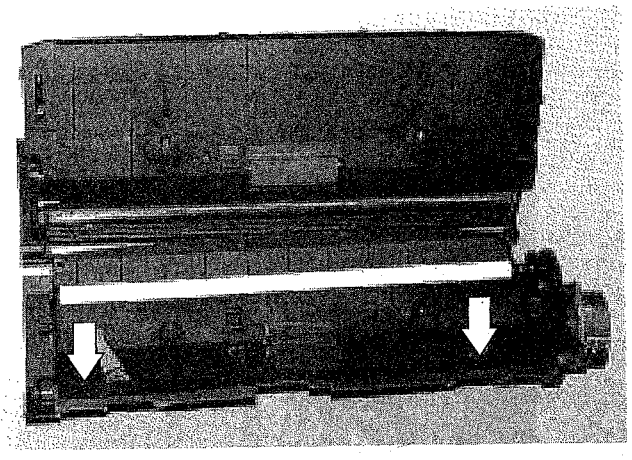


fig. 4a

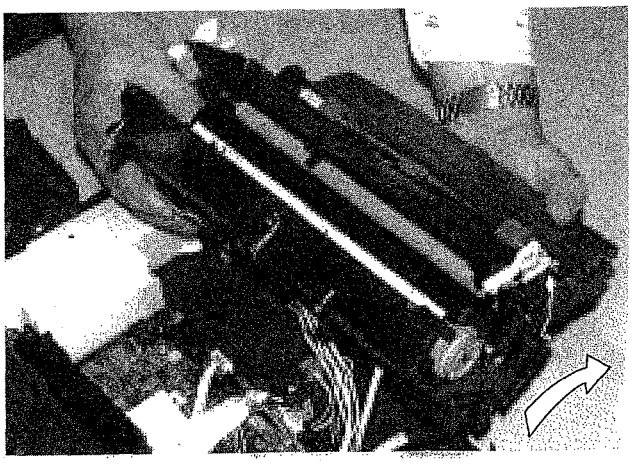


fig. 4b

7.4. SCANNER MODULE

7.4.1 Remove Scanner module

1. Put away the handset, trays and Ink Foil.
2. Remove Tel. cover and Pick up module
3. Once the Pick up Module is out, close the OPU and lift it gradually. (see fig 5)
4. Turn the scanner module slightly face down and disconnect the motor, SSB sensor, Scanner, OPU.

NOTE: Every time the scanner has been replace, Function 45 code 7216 White Reference has to be performed.

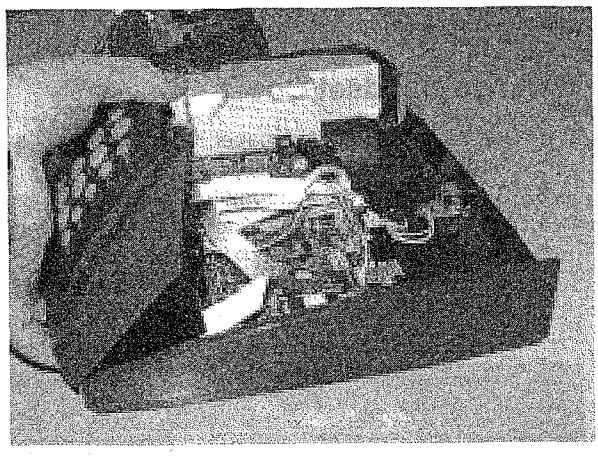


fig. 5

7.5 POWER GENERATOR UNIT

7.5.1 Remove PGU

1. Put away the handset, trays and Ink Foil
2. Remove Tel. cover, Pick up module and Scanner Module
3. Remove the screw that secures the PGU.
4. Lift and remove Power cable - 6p. (see fig 6)

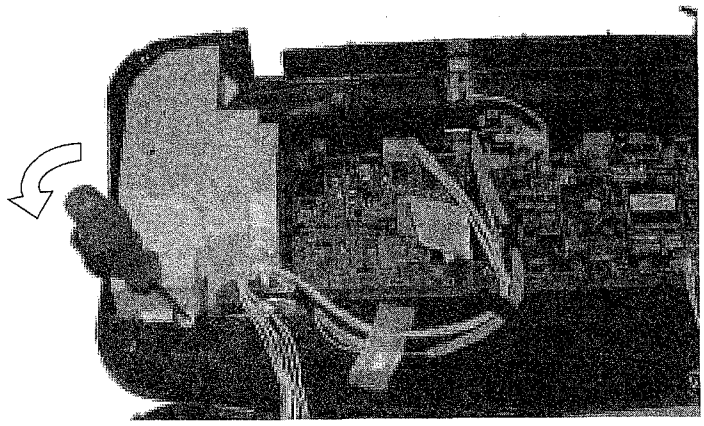


fig. 6

7.6 SCANNER UNIT

7.6.1 Remove Scanner Unit

1. Put away handset, trays and Ink Foil.
2. Remove OPU (the Scanner unit can be remove if necessary).
3. Open the Scanner module half way, and dis-engage the door lever in the side. Close the snaps with needl nose plier (see fig. 7a and fig. 7b).
4. If no plier is available, use small srewdriver to close snaps while holding it the Scanner with your finger (see fig. 7b and fig. 7c).
5. The Scanner springs out. Remove cables. Carefully remove Scanner.
6. To mount the Scanner, inverse the Procedure.

NOTE: Every time the scanner has been replace, Function 45 code 7216 White Reference has to be performed

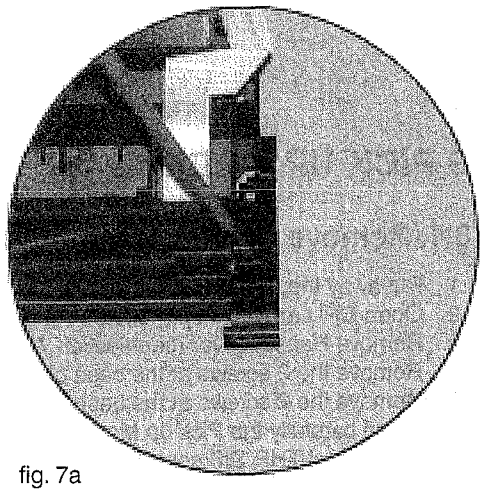


fig. 7a

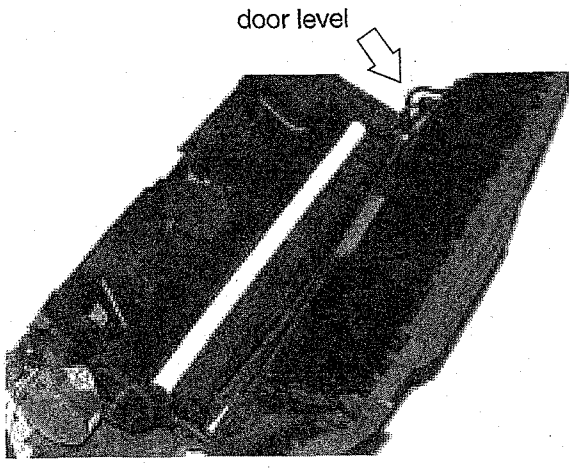


fig. 7b

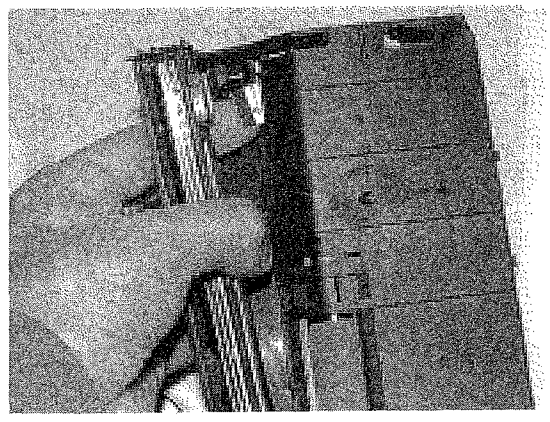


fig. 7c

7.7 ADF LIPE

7.7.1 Remove ADF

1. Open the OPU. No need to remove any module.
2. The ADF is localted in the center of the module.
3. With a very thin hook, lift the left and right leg from the paper-spring, note that both legs are out before you slide the spring. Once is free, you can remove the ADF (see fig. 7a).
   A very thin screw driver can be used if no hook is available.

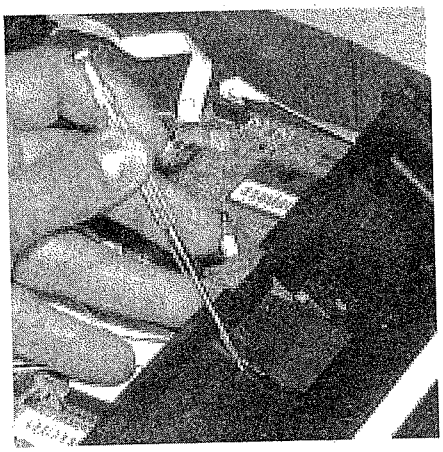


fig. 7a

7.8 THERMAL PRINTER HEAD

7.8.1 Remove TPH

1. Put away the handset, trays and Ink Foil.
2. Remove Pick up module. Disconnect cables carefully.
3. Open the module. Remove the Printer module from the Pick up module, by opening the joint (see fig. 8a).
4. Set the Printer module in clear space. Remove on top the safeties on the sides of the THP. Use flat screwdriver. Press down the knotch, then upwards, until they are free (see fig. 8b).
5. Release the TPH hinges at the sides of the TPH, by pressing carefull to the side (see fig. 8d) and ...
6. Turn the TPH back over. Unsnap the hooks at each side. Press firmly (see fig. 8c).
7. Gently the legs from the cover, out of the small canal (see fig. 8e). Help the THP by pulling from the base at the fork.
8. Pull slowly the TPH and the cover up, until the cables are free. Disconnect and put in a save place (see fig 8f).

NOTE: When replacing the TPH, press always in place until you hear the snaps. Check that the cover falls in place. NEVER PRESS ANYWHERE IN THE CENTER OR THE THERMAL HEAD. This can cause permanent damage to the Head. Please don´t forget to put the safeties back (see fig. 8g).

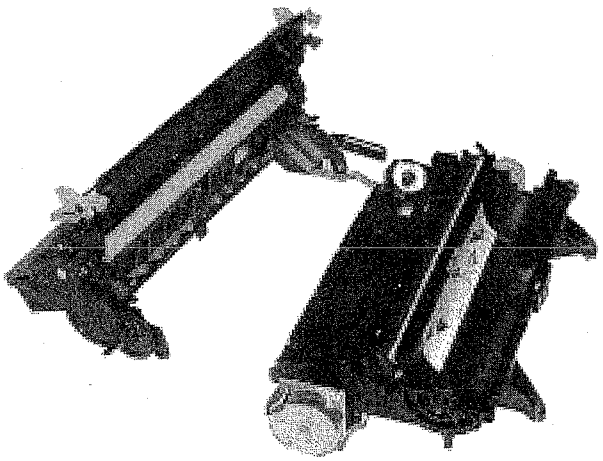


fig. 8a

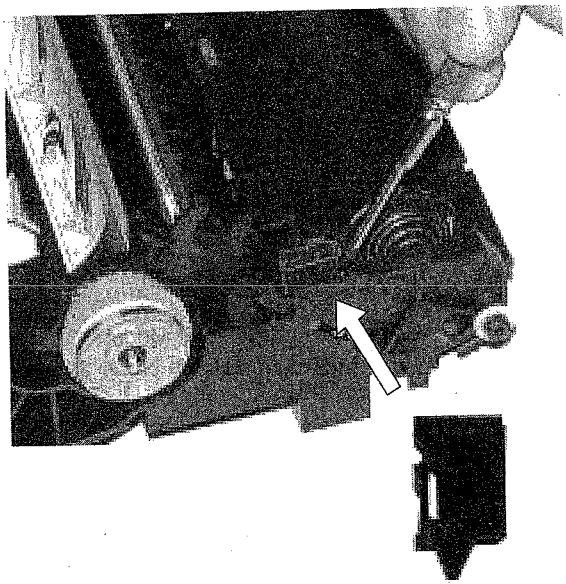


fig. 8b

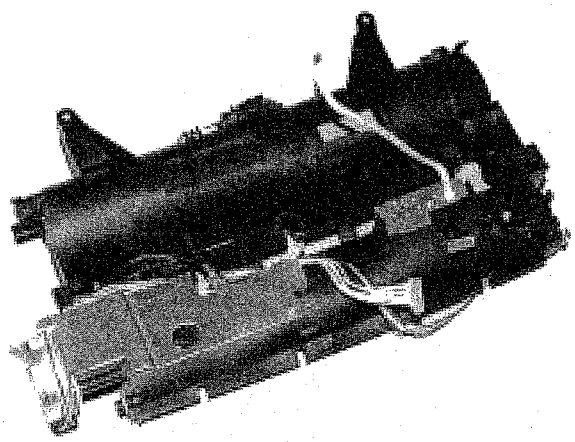


fig. $8c_1$

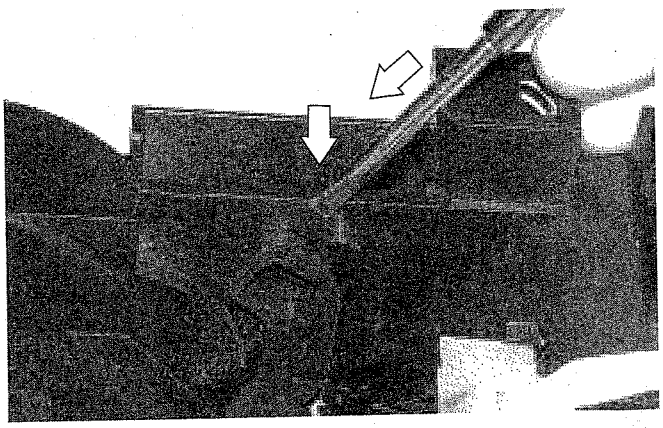


fig. $8c_2$

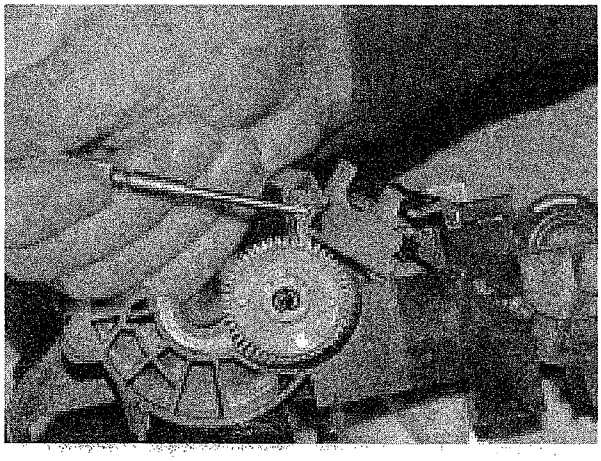


fig. 8d

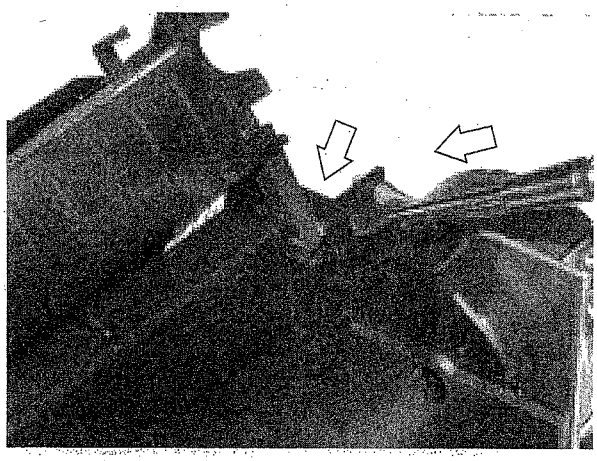


fig. 8e

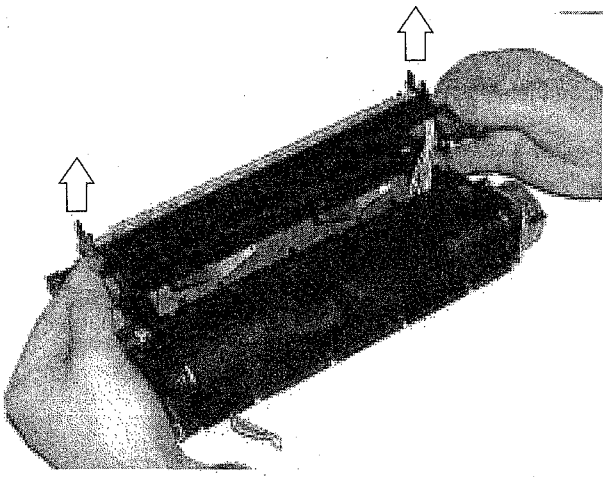


fig. 8f

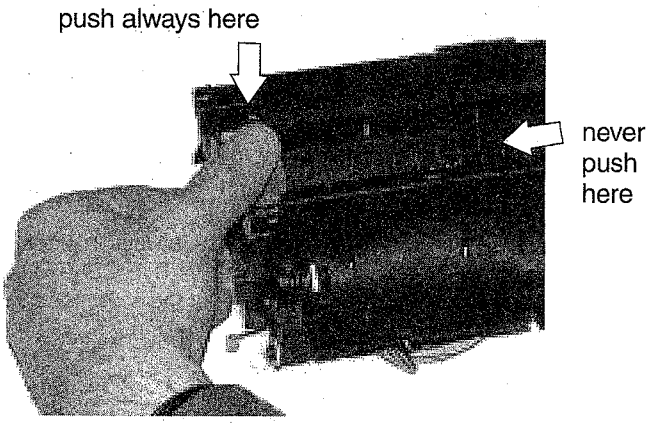


fig. 8g

7.9 LIU - FCU - NDB

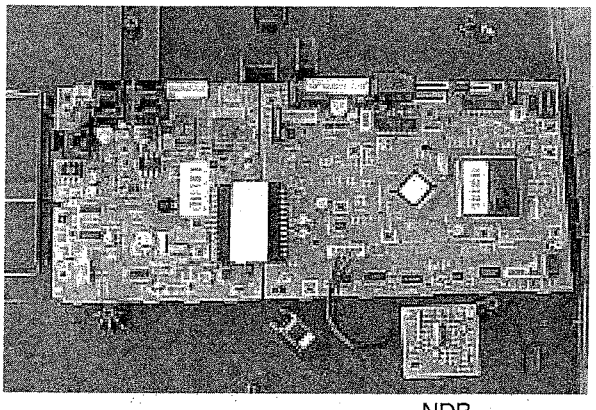
7.9.1 Remove LIU

1. Remove Pick up and Scanner Module. Disconnect cables carefully except from FCU-LIU
2. Remove the screws and lift the LIU slightly out.
3. Disconnect the cable from the FCU.

7.9.2 Remove FCU and NDB

1. Remove Pick up and Scanner module
2. Remove carefully disconnect all cables except from LIU-FCU
3. Remove screws and lift the FCU slightly out.
   Remove the cable from LIU.
4. Take in account the order of the 5 screws that hold the FCU
   see page 3-12

NOTE: For New Versions, the NDB will be already integrated in the FCU. Check all the Board Connections before closing the Machine.



8 ARCHITECTURE

8.1 WIRING

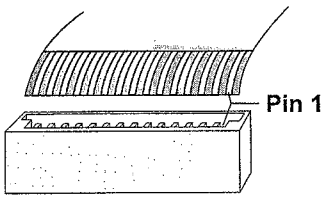
Nr	From	To	Pins
1	LIU(813)	Handset	4
2	CIS-Dyna	FCU (405)	10
2	CIS-Rohm	FCU (435)	7
3	SSP sensor	FCU (451)	6
4	SSB sensor	FCU (471)	7
5	SIF sensor	FCU (481)	3
6	PTT	LIU (812)	4 or 6
7	EXT	LIU (811)	4 or 6
8	PGU	FCU (401)	10
9	LIU (804)	FCU (404)	27
10	LIU (834)	FCU (434)	5
11	Step Motor	FCU (407)	5
12	PP motor	FCU (408)	5
13	TPH CKL-DT	FCU (409)	10
14	TPH JST	FCU (406)	9
15	OPU (603)	FCU (403)	8
16	LCD	OPU (602)	10
17	SPR-POTS	LIU (837)	4
18	HSB (941)	LIU (841)	8
19	HSB (943)	Speaker	2
20	HSB (942)	FCU (432)	2
21	FBP power	FCU (436)	3
22	IRB	FCU (431)	8
23	MIC	FCU (438)	4
24	SOS	SSP (652)	3

NOTE: When the CIS has been replaced, check always Software version. Dyna CIS and ROHM CIS versions might differ on basic characteristics. Conntact the Service Support Dept. for Technical Information.

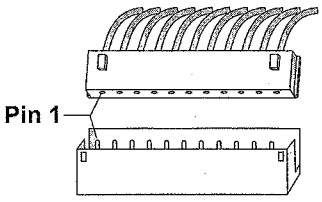
8.2 PIN ASSIGNMENT

8.2.1 Pin description in order

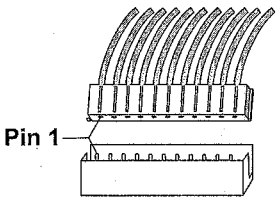
Type 1:



Type 2:



Type 3:



8.2.2 Connectors on the FCU

P401 - Power supply

Pin Nr.:	Assignment	Direction	Type	Description
1	PSAVE	Out	Digital	Power save signal
2	DGND	In	Ground	Hook sensor ground
3	CRADLE	In	Digital	Hook cradle signal
4	PFAIL	In	Digital	Power fail signal
5	VCC	In	Analog	Supply for D/A TTLs (+5V)
6	DGND	In	Ground	Ground
7	DGND	In	Ground	Ground
8	+24V	In	Analog	Supply for TPH, LED-Bar, Motor, LS-Ampr...
9	+24V	In	Analog	Supply for TPH, LED-Bar, Motor, LS-Ampr...
10	-5V	In	Analog	Supply for analog parts (-5V)

P403 - OPU

Pin Nr.:	Assignment	Direction	Type	Description
1	OPUVCC	Out	Analog	+5V (OPU-supply)
2	DGND	Out	Ground	Ground
3	LCDEN	Out	Digital	LCD enable signal
4	OPUSTR	Out	Digital	Strobe signal
5	OPUOD	Out	Digital	Data output signal
6	OPUID	In	Digital	Data input signal
7	DGND	Out	Ground	Ground
8	OPUCLK	Out	Digital	Serial Clock signal

P404 - Modem interface

Pin Nr.:	Assignment	Direction	Type	Description
1	VCCP	Out	TTL	Hookswitch in
2	SGP	In	Digital	Gear position sensor
3	MUTE	Out	Digital	mutes AC during DTMF dial
4	PSTN/PABX	Out	Digital	Change AGC for PABX
5	DMO	Out	Digital	Current raise during pulse dial
6	LOOP	In	Digital	High line Voltage (<0,5V)
7	CRADLE	In	Digital	Hookswitch out
8	PD	Out	Digital	High make
9	HOOK	Out	Digital	High off hook
10	RING	In	Digital	Signal for ringdetection
11	DGND	Out	Ground	Digital ground
12	VCC	Out	Analog	+5V (digital parts)
13	AGND(CNG)	In	Analog	Detection of signal on a2, b2
14	MTXD	Out	Analog	Modem send
15	MIC	In	Analog	Microphone signal for TAM
16	AGND	Out	Ground	Analog ground
17	MRXD	In	Analog	Modem receive
18	-5V	Out	Analog	-5V (modem interface)
19	VCA	Out	Analog	+5V (modem interface)
20	FSW1	In	Digital	Switches relay of local group
21	FSW2	In	Digital	Switches ring generator on
22	LOUDNESS	In	Digital	Switches acoustic levels
23	RINGS	In	Digital	Switches ring sensitivity
24	POL_REV	Out	Digital	High if Ia is positive
25	CID_IMP	In	Digital	Switches CID impedance to the line
26	PAR_IND	Out	Digital	low if LN+>t.b.d, or Vp>t.b.d.
27	+24V	In		Necesary for ring generator

405 / 435 - Scanner interface (Dyna CIS is a 10 pin FCC/ROHM CIS is a 7 pin JST connector)

Pin Nr.	Assignment	Direction	Type	Description
1	+24V	In	Analog	+24V - LED-bar supply
2	LEDON	Out	Analog	Switched LED. Ilumination On/Off
3	SCLK	Out	Digital	Video Clock signal
4	SLS	Out	Digital	Line Start Signal
5	SLSY	Out	Analog	Line synchron signal
6	DGND	Out	Ground	Ground
7	SVIN	In	Analog	Video Signal from CIS
8	SVCC	Out	Analog	Scanner +5V
9	DGND	Out	Ground	Ground
10	SVIN	In	Analog	Video Signal from CIS

P406 - Printer interface

Pin Nr.	Assignment	Direction	Type	Description
1	+24VSW	Out	Analog	+24V switched
2	+24VSW	Out	Analog	+24V switched
3	DI	Out	Digital	Data out signal
4	STB3	Out	Digital	Strobe 3 signal
5	STB4	Out	Digital	Strobe 4 signal
6	VCC	Out	Analog	+5V
7	DGND	Out	Ground	Ground
8	DGND	Out	Ground	Ground
9	DGND	Out	Ground	Ground

P407 - Stepper motor

Pin Nr.:	Assignment	Direction	Type	Description
1	PMPHA	Out	Analog	PHASE1
2	PMPH_A	Out	Analog	PHASE2
3	PMPHB	Out	Analog	PHASE3
4	PMPH_B	Out	Analog	PHASE4
5	+24V	Out	Analog	+24V - Supply for the stepper motor

P409 - Printer interface

Pin Nr.:	Assignment	Direction	Type	Description
1	DGND	Out	Ground	Ground
2	DGND	Out	Ground	Ground
3	THERM	In	Analog	Thermistor for temperature control
4	STB1	Out	Digital	Strobe 1 signal
5	STB2	Out	Digital	Strobe 2 signal
6	LAT	Out	Digital	Data latch signal
7	CLKTPH	Out	Digital	Data clock signal
8	+24VSW	Out	Analog	+24V switched
9	+24VSW	Out	Analog	+24V switched
10	n.c.			

P943 - Loudspeaker

Pin Nr.:	Assignment	Direction	Type	Description
1	AGND	Out	Ground	Ground
2	LOUD	Out	Analog	Signal for the loudspeaker

P471 - Sensor Scanner Board SSB

Pin Nr.:	Assignment	Direction	Type	Description
1	DGND	Out	Ground	Ground
2	VCSDI	Out	Analog	SDI-supply
3	SDI	In	Analog	Sensor Document In
4	SAF	In	Analog	Sensor Signal ADF
5	DGND	Out	Ground	Ground
6	VCSOP	Out	Analog	SOP-supply
7	SOP	In	Analog	n.c.

8.2.3 External Connectors

P812 - PTT line

Pin Nr.:	Assignment	Direction	Type	Description
1	NC	-	-	Not connected
2	LA2	Out	Analog	Tel. line out
3	LA	In	Analog	Tel. line in
4	LB	In	Analog	Tel. line in
5	LB2	Out	Analog	Tel. line out
6	ATKL	Out	Analog	Parallel phone (only france)

P813 - Handset

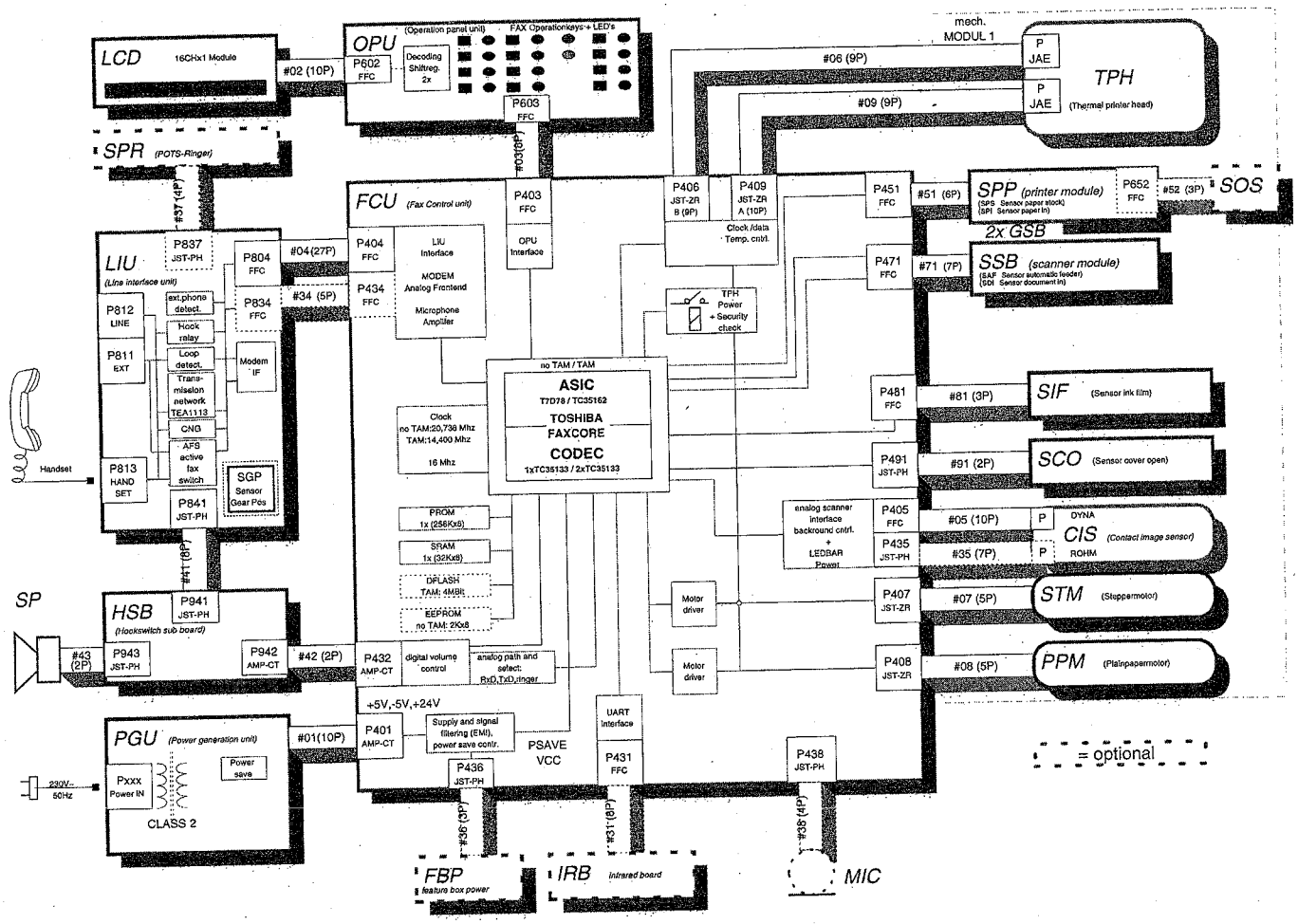
Pin Nr.:	Assignment	Direction	Type	Description
1	MIC-	In	Analog	Mouthpiece microphone
2	EAR-	Out	Analog	Earpiece speaker
3	EAR+	Out	Analog	Earpiece speaker
4	MIC+	In	Analog	Mouthpiece microphone

P811 - External

Pin Nr.:	Assignment	Direction	Type	Description
1	MIC-	In	Analog	Mouthpiece microphone
2	EAR-	Out	Analog	Earpiece speaker
3	EAR+	Out	Analog	Earpiece speaker
4	MIC+	In	Analog	Mouthpiece microphone

8.3 BLOCK DIAGRAM

PCB	Connected to
FCU (*F*ax *C*ontrol *U*nit)	SSB, SSP, SIF, SCO, LIU, OPU, PGU, STM-Motor, CIS,TPH, MIC, IRB, HSB, FBP, NDB (integrated in FCU for new versions)
LIU (*L*ine *I*nterface *U*nit)	FCU, EXT. PTT Line, Handset, HSB, SPR
PGU (*P*ower *G*eneration *U*nit)	Hookswitch FCU, mains
OPU (*O*peration *P*anel *U*nit)	FCU



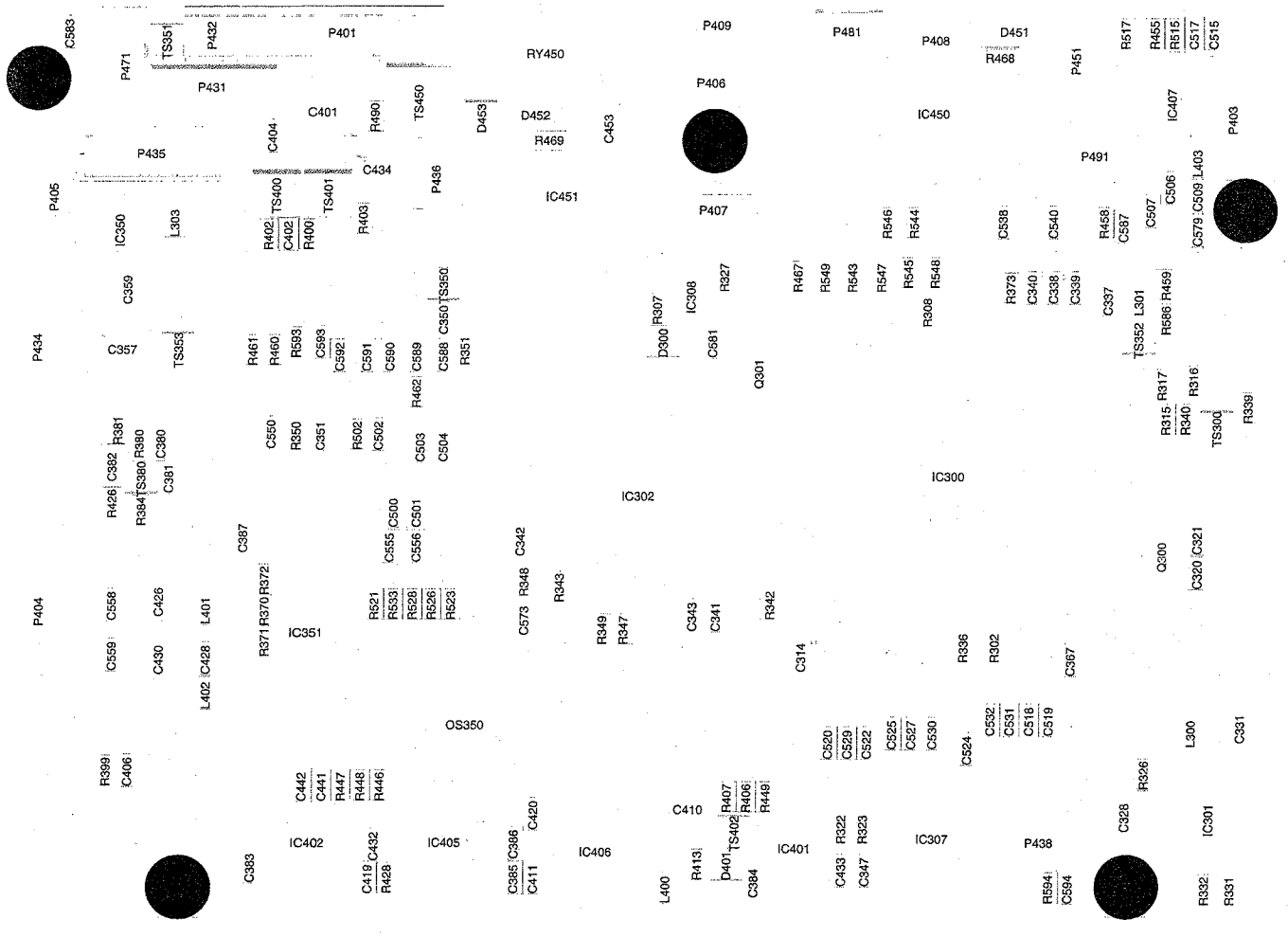
8.4 PCB DESCRIPTION

8.4.1 FCU - Fax control unit

FEATURE LIST

- Fax core (CPU + Codec base on TOSHIBA 7TD78, TC35162)
- Memory block: PROM (128k x 8) max 256 K
  SRAM (8k x 8) max 128k
  Serial-FLASH (4 MBit) max 8Mb.
- Clock generation
- Scanner interface
- Thermo print head interface
- Stepper motor driver
- Serial Interface OPU
- Flexible Interface to LIU (prepare for special features)
- Serial Interface to IRDA controller IC (TC35162 only)
- Microphone, loudspeaker, and sensor amplifiers..
- Digital volume control
- TPH temperature control
- Error difusion (TC35162 only)

Use ONLY this same screws!! :



CONNECTORS

P404	LIU, 27 pin	P401	PGU, 10 pin	P407	Steppermotor, 5 pin	P436	FBP, 3 pin
P403	OPU, 8 pin	P406	TPH, 9 pin	P432	HSB, 2 pin	P431	IRB, 8 pin
P405	CIS, 10 pin	P409	TPH, 10 pin	P451	SPP, 6 pin	P481	SIF, 3 pin
	(Rohm 7pin)	P408	PPM, 5 pin	P471	SSB, 7 pin	P491	SCO, 2 pin

POWER SUPPLY

The FCU is powered by the PGU with -5V, +5V and 24V via connector P401 .

KERNEL

The kernel of the system is a two chip solution from Toshiba (3 chips for full duplex hands free funct.) It consists of a CPU and a controller IC (IC300) including DSP for modem functions and a CODEC chip (IC301) for A/D and D/A convertion and the analog front end.

MEMORY

The memory block consists of an OTP - IC302, a SRAMs - IC 303 and a serial -FLASH IC304.The Serial-FLASH is used for speech storage and for page memory. Further more usable programable data (names, numbers etc..), are stored in the Serial Flash. In the TAM version, the data is store in an EEPROM.ROM size is twice 128 up to 256x8Kk and a serial Flash with a size of 4Mb. (opt. 8Mb. in one chip) for TAM solution

CLOCK GENERATION

There are three oscillators to drive the system The first MODEM Fq. of 20MHz (56.6 kHz for TAM.), the 16Mhz for the CPU and the 32Khz oscillator for the RTC which used for power safe function.

RESET CIRCUIT

The reset circuitry is a resistor and capacitor network.

SCANNER INTERFACE

Consists of an internal and external part. Externallly, the video goes thorugha buffer and filter circuitry (IC350) and kpasses a clamp circuitry (TS352) ti ser DC level to a deined value for each line. Internally is nad additonal clamp and a sample and hold circuitry. Then, the video comes to the A/D converter. For DYNA CIS a 10p FCC cable is implemented. For ROHM CIS a 7p JTS.

PRINTER INTERFACE

The printer interfaceis a standard interface to a thermal printer head. There are only some R-C filters to avoid EMI on the connector. The +24V for the TPH can be switched under software control. For security reasons and AC signal must be applied at the TPHON to switch the voltage on. Any DC level at this pin will switch off the 24V. So in case of a hardware damage of the core the +24V is switch off, which puts the TPH again in a safe aperation mode, even if the strobes of the TPH are still LOW. The AC signal must be in the range 100-800 Hz with a HIGH level time between 50-300us, preferred values are 400Hz and 100us

STEPPER MOTOR INTERFACE

For driving of the stepper motors, a ULN2003 driver IC is used. The driver supports stepper moters with +24V / 200ma max of unipolar type. In the Galileo family, one motor is used for the scanner and the other motor for the printer engine, whereas in a one motor concept is implemented

OPU INTERFACE

The OPU is controlled by the FCU by means of a 8 pin connector P403. For POTS Mode functionality, the information of the keyboard is by passed to the LIU with connector P434.

MODEM INTERFACE

The RxD sigdnal is amplified with IC402 before it goes to the CODEC IC301. The TxD signal is AC coupled to the filter path IC402, IC403 (for voice an additional filter is necessary). It is possible to switch different signals to the speake: RxD, TxD and SPKCLK (for key beep) In the other hand, RxD or the microphone signal can be switched to the A/D part of the CODEC:

MICROPHONE AMPLIFIER (G2 ONLY)

For TAM features a microphone amplifier with AGC is implemented. This circuit consists of IC401, TS402 and clue logic. The microphonesignal comes in from the handset and is amplified in the IC to a level of appr. 0dBm. If the level on the output increases above this level, the transistor is conducting and the level of the input signal will be reduced.

LOUDSPEAKER AMPLIFIER

The output amplifier for the loudspeaker is built around IC400 and TS400, TS401. Analog sources for this amplifier are RxD, TxD and the key beep signal. This sources acan be selected under software control with the analog switches IC405, 406. A digital volume control (IC405 and resistors) with 8 steps is used.

POWER SAVE FUNCTION

For the power save mode a maximum of 80mA is allowed on the VCC line. Therefore a switch disconnects different parts of the FCU from VCC in this mode. This switch is realized with TS350 and clue logic.

SSB: PAPER SENSORS SOP AND SDI

This sensor are used for document in detection and out of paper detection. A reflex coupler is used for out of paper detection, and hybrid light barrier for document in detection.
The document in sensor is connected to P471, the out of paper sensor is placed on the PCB. The digital information of this sensor is directly connected to the I/O pins.

SENSOR CONNECTOR

For the machine additional sensors are necessary to detect in and out paper position. A special connector is used (P451 for SPS, SPI). Other sensors are connected to P471 (SDI,SAF) SIF is connected to P481. SCO is connected to P491. SFI sensor P481is a reflex coupler to detect the ink film for the thermal transfer printhead. Physically it is connected to the SOP pin of the FCU. For SPI adn SPS a hybrid barrier is used. The SAF is uded for the document feeder also as a Hybrid Light Barrier.

6 sensors: SDI - Document In Sensor; SPI - Paper in Position; SAF - Automatic Document Feeder; SAF - sensor autom. doc. feeder; SPS - Paper Stock Sensor; SCO - Cover Switch

SERIAL INTERFACE CONNECTOR FOR IRDA

For G1-G2 machines, a serial interface connector -P431- is mounted to control an IRDA interface board (only TAM), because the UART is not integrated to low cost version of the Core. IC TC35162

EMC COUNTERMEASURES

Thera several components for EMI reduction in the PCB. Is necessary, due to VHF (56.6Mhz Modem CKL). For that reason, special care has been taken in the PCB layout, such as for all supply pins are decouple by at least one capacitor. Analog supply voltages are decoupled with L-C networks. Critical signal lines use RC networks. All digital lines which leave the board via a connector, are additionally decoupled by a capacitor.

8.4.2 LIU - Line interface unit

The LIU is the interface between the FCU and the telephone line. The basic device wich is connected via the LIU, has a galvanic telephone groung connection wich brings an extraordinary simplification:

a.) Simple HV protection
b.) no modem transformer
c.) no optical decoupling to main circuit
d.) TAM Rec. via handset
e.) A cheaper resisitive current measure methode
f.) POTS mode ringing device provided by subprint module.

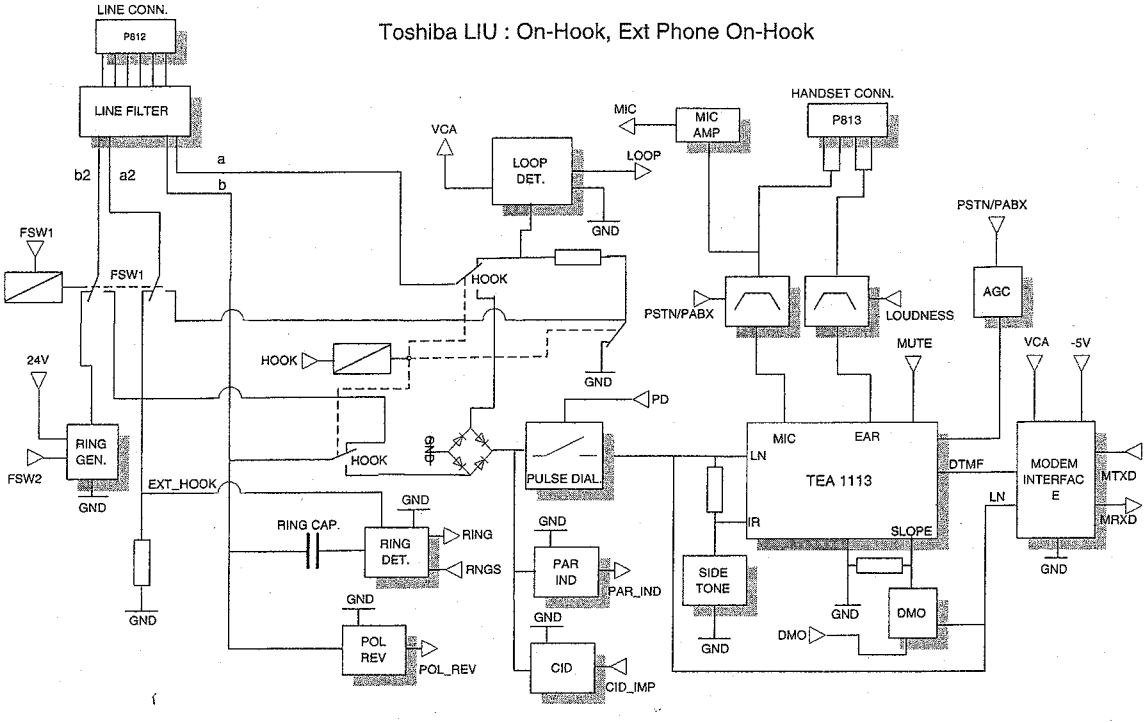
The Line interface has to fulfill all PTT requirements for various countries. Some parts of this board are country specific and have to be mounted with different values.

FEATURE LIST

- line protection and filtering
- loop detection
- loop det. of ext. phone (non POTS)
- hook switch relais (non POTS)
- ring detection
- ring generation-buzzer SPR (ringing device - POTS)
- modem interface
- external phone detection (non POTS)
- country detection
- dialling (pulse, DTMF, flash)
- corded phone
- CNG-detection

BLOCK DIAGRAM

Toshiba LIU : On-Hook, Ext Phone On-Hook



CONNECTORS

The LIU provides the following connectors:

P804	FCU Interface	P811	Ext. Connector
P834	FCU	P813	Handset Connector
P812	Line Connector	P837	SPR POTS ringer (optional)

CIRCUIT DESCRIPTION

The connection of the PSTN to the unit is done via the connector P812. After the protection devices D802 - D801,(280V), the line jumper field and the line filter L802, the signal goes to the hook-switch relay RY801. The dtax pulse filter(D und CH) is built arround L803-L804 und L805, and can be adjusted to 10 and 16 KHz. C801, C802 are important for EMC and also for line balance adjustment. RY801 switches the signal ATKL, which is only used in France, by the pins 2,3,4.

PHONE CHIP (TEA1113)

The phone chip is the Philips Multi-standard Analog Bipolar Speech Transmission Network and is responsible for:

- 2 to 4 - wire interface for the handset.
- Acoustic adjustments like frequency response and level for the transmission and receive part.
- Sidetone compensation adjustment.
- DC characteristic of the phone and the fax and the answering device.
- AC characteristic of the phone, fax and answering device.
- Feeding the DTMF signals which are generated from the FCU board to the line.
- Supply for electret microphone. Dynamic limitation in transmit direction.
- Line loss compensation (AGC).

The fax transmit signals are coupled to the line via the DTMF input of the telephone chip, the fax receive signal is directly coupled from the line to the phonechip input LN+ and via wire direct to the modem. Both receive and transmit pass through the modem hybrid circuit that provides frequency response and gain adaptation and is also responsible for the echo cancelling in transmit mode.

RINGER DETECTION

The ring signal is decoupled via C808, divided by R816and R805 and produces a TTL signal via TS805. IC804 connects R915 in parallelto R805 to provide steps of sensitivity. RGNS=high..low sensitivity. The Diodes D817 and D818 provide a voltage fall off, if AC impedance is measure with high Voltage.

INTELLIGENT (ACTIVE) FAX SWITCH - FUNCTIONAL PRINCIPLE

The line out connection is available at La2-P812 and Lb2-P811. In idle mode, the relay RY802 is activated, therefore no connection between La2 and Lb2. This makes possible that en external SERIAL phone caoont ring at an incomming call. The local loop feedeing and ring generation is made by IC750. In idle mode, La2 and Lb2 are connected between 24V via R751, L750, D750 and R761 and the current sensing reistor R918 and ground. The input signal FSW2 -P804, has to be pulsed to produce a DC voltage of about 150V by IC750. It is a step converter which switches with 50KHz. FSW2 is switched with 20 to 50 KHz - country dependant- so that the rectangular ringer signal is generated at ROUT.

- Outgoing call from Ext. Phone:
  in idle mode, the external mode is connected to the local loop feeding (+24V). If the external phone goes off hook, a loop current within the 24V is looped, detected by R918. The signal loop, tell the software to switch the external phone Lb by setting FSW1 ti high. Now, Ext. Phone is on line.
- Call transfer from external phone to fax:
  If in hook condition of external phone, a DTMF or a flash is sent by the Ext. Phone, this signalizes the fay, via the modem path, to generate an acoustic ring signal at the fax. This could be problematic if two identicdal fax machines are using the same DTMF code. An individual code is necessary. Cordless phone - DECT technology.
- Call transfer from fax to external phone:
  The procedure is iniciated by a DTMF code or a special key. A ring signal is generated by swtching FSW2 on and off.. country dependant ringer frequency. The ext. phone rings. During this time, the fax could send ring back tones or a music on hold to the line. As the external phone seizes the line, the LOOP signalgoes low. Then, the a-b line is conneted to the Ext. Phone by setting FSW1 to low.
- Incoming ring.
  a) Fax calling: the fax goes off hook after first ring detected. If CNG detected, Fax. transaction is iniciated. Ext. Phone do not ring.
  b) Phone call: the fax goes off hook after first ring detected. No CNG detected. The fax rings back. At the same time, send a ring signal to the Ext. Phone. If after the last ring back count, the call has not been answered. fax iniciates Transaction. This assures communication for eventual Silent Fax machines.

LOOP CURRENT DETECTION

Absence of the loop current is detected by a comparator.
If the line voltage is too low the logic signal becomes LOW. On the contrary it's HIGH.

PARALLEL INDICATION

The voltage at La Lb is measured beteewn the hook relay and the pulse diallling FET. The signal PAR_IND at the collector of TS790. The signal PAR_IND has to be checkedin case of an incoming call, inmedialtelly after a ring is detected. If a phone connected in parallel sizes the line, the signal PAR_IND becodmes high.

COUNTRY SWITCHING

The LIU provides the possiblity t cover several country versions. This is possible for A, B,NL,E,P,SF and the international version. This countries require 600Ohm impedance on line. The adjustments are done by four analog switches included IC804. The settings are controlled by the signals LOUDNESS, RINGS and PSTN/PABX.

MICROPHONE PATH FOR OGM RECORDING

For OGM recording the handset microphone signal is fed to the FCU board. The gain will be adjusted by an RC network.

8.4.3 OPU - Operation panel unit

The OPU (Operational Panel Unit) is the human interface to the facsimile machine. The status is displayed by a LCD and a number of LED's. A keyboard is provided for operator entry. There are OPU type keys (such as functions, quick dial etc.) and the standard telephone dialpad (0...9, *, #). All functions are performed by the core on the main board. The keyboard status is scanned after an interrupt from the keypad.

KEYBOARD

The keyboard matrix consists of six columns and six rows. The software debounces the keys and if two keys are pressed ignores this case and treats it as no key pressed.

LCD DISPLAY

A 16 character LCD whith a line of 6 activ icons is used and connected to P603 . The LCD is configured to 4 bit data transfer.

CONNECTORS

The OPU is connected to the FCU by means of a eight pin connector P403 providing power and the scanning matrix / serial interface.

8.4.4 PGU - Power generation unit

The PGU is located in a VO plastic material housing, at the left side of the machine.
Feature list:

- +24V (printhead, stepper motor, scanner illumination)
- + 5V (digital circuits, sensors, modem, analog circuits, scanner)
- - 5V (analog circuits, scanner)
- Power fail signal (if 24V drops)
- Cradle signal (on/off hook)

CIRCUIT DESCRIPTION

The input voltage rated:	110VAC/230VAC... Europa 220VAC-240VAC
frequency:	50/60Hz
Power consumption:	typ. 3,0W at 230VAC - stand by mode
dip protection:	10ms at 230VAC (IEC 100-4-11)
	24VDC / 1,5A, +5V / 350mA
reversion:	automatic
inrush current:	40A max.

OUTPUT PROTECTIONS

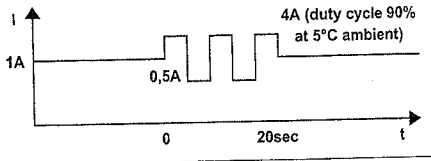
shot circuit:	each output to GND mas 5 sec. Reversion automatic.
overvoltage:	max 35VDC (+24V). Reversion automatic.
overtemperature:	max 80+4 C

Undervoltage detection
This circuit monitors the +24V supply voltage and generates an active low open collector power-fail signal, if the supply goes down. This PFAIL signal is connected to the FCU and forces the CPU to go to the power-save mode. "Power-fail" is detected, if the +24V output drops to 11V.
The PFAIL signal goes low about 2 ms (at typical load) before VCC falls out of tolerance.

AC INPUT CONDITIONS

Phase:		**single**
Input voltage:	rated: range:	230 VAC 110 ... 264 VAC
Frequency:	rated: range:	50 Hz/60Hz 47 ... 63 Hz
Power save mode:		typ. 3W at 230VAC
Dip protection:		10ms at 230VAC IEC 1000-4-11 (+24V/1,5A +5V/350mA -5V/38mA)
Reversion:		automatically

DC OUTPUT CHARACTERISTICS (OPERATION MODE)

Voltage	Ripple voltage	Current
+24,3VDC + 0,4V/-0,5V (0-1,4A)	max. 2Vpp (20MHz bandwith) max. 0,6Vpp at changing load (0,3-4A, 100Hz, duty cycle 10%)	
+5VDC ±5%	50mV rms (200Hz-10kHz)	typ. 600mA max. 350mA
-5VDC ±5%	50mV rms (200Hz-10kHz)	typ. 55mA max. 38mA

DC OUTPUT CHARACTERISTICS (POWER-SAVE MODE)

Voltage	Ripple voltage	Current
+24,3VDC ±0.5V	4Vpp max.	typ. 6mA max. 2mA
+5VDC ±10%	50mV rms (200Hz-100kHz)	typ. 120mA max. (G1:72mA, G2: 80mA)
-5VDC +10%/-20%	50mV rms (200Hz-100kHz)	typ. 40mA max. 30mA

POWER FAIL SIGNAL GENERATION: MONITORS THE 24V OUTPUT

Output:	active low, open collector, 10mA sinking capability (5V)
Threshold:	11VDC ±0,5V
Hysteresis:	0,5V
Condition:	+5V within tolerance for 2msec min. after PFAIL goes active

EMI

Conducted:	regulation -6dB (all loads) (according to EN 55022/class B)
Radiation:	regulation -6dB (all loads) (according to EN 55022/class B) an additional filter on the mains inlet is required to prevent from radiation of FCU generated RF-noise

SAFETY REQUIREMENTS:

EN 60950 class II equipment including NORDIC exceptions

High-pot test **Input to output:**	3kVAC for 1sec (<10mA)
Insulation resistance:	>10MOhm 500VDC
Housing:	in accordance to EN 60950/4.4.6 (five enclosure)
Output:	in accordance to EN 60950/2.11 (limited power source)

RELIABILITY:

MTBF at standby:	1 000 000 hrs (power save mode <2W)

CONNECTORS AND CABLES

Input:	Class II connector
Output:	cable with 10-pin AMP-CT connector .pin1.....pin 10 -5V-24V-24V-GND-GND-+5V-PFAIL-N.C.-N.C.-PSave

9 TROUBLE SHOOTING

9.1 SERVICE REPORT

The service report (function 72) is a listing of the most recent (10) error codes and gives information of the (5) most recent communications that experienced errors. The Error code column indicates communication errors:

1. Enter the service function (see section 7.3).
2. Press ENTER - The Service report list will be printed now.

SERVICE REPORT

TIME	ERR.CODE	REMOTE MACHINE	TX/RX	PAGES	SP	RESOL.	CODING
	04		R	0			
	04		R	0			
	42						
	04		R	0			
	40	4316010112345	R	1	96	STANDARD	MR
	31	4316010112345	R	2	96	STANDARD	MR
	40						
	06	4875	T	1	96	STANDARD	MR
	04		R	0			
	06	4316010154321	T	1	96	STANDARD	MR
	42						
	06	4316010112345	R	2	96	FINE	MR
	06	4172	T	0			

Position	Description
TIME	DATE AND TIME
ERR.CODE	SEE SECTION
REMOTE MACHINE	NOT AVAILABLE THE CALLED TELEPHONE NUMBER
TX/RX	TX = TRANSMIT, RX = RECEIVE
PAGES	NUMBER OF PAGES TRANSFERRED IF TRANSMISSION OCCURED
SP	TRANSMISSION SPEED (9600, 7200, 4800 OR 2400 BPS)
RESOL.	RESOLUTION (STANDARD/FINE/PHOTO)
CODING	MR OR MH

9.2 ERROR CODES

Nr.	Error message	Description	Action
00	FAX OK	Transaction was succesfull	None
01	PICT. QUALITY	The transmitted or received picture quality was unacceptable	Check line connection. The other machine can be incompatible. Send to another machine. Adjust output level. Switch on echo cancelling BSW 04.
02	TIME OUT	The remote machine gave no answer within the specified time	Check line connection. The other machine can be incompatible. Send to another machine.Adjust output evel.
03	DCN RECEIVED	The remote machine terminated the communication. Possibly TX rejected	Other machine is out of paper, has a paper jam or STOP was pressed during the transaction
04	LINE DISCONNECT	An expected command has not been received. Possibly the line was disconnected	Check line connection. The other machine can be incompatible. Send to another machine. Adjust output level.
05	NO RESPONSE IN ALL TRIES	The receiver did not reply the third training signal or the pixel message (receive quality unknown)	Check line connection. The other machine can be incompatible. Send to another machine. Adjust output level. Exchange FCU - LIU
06	ABORTED	The TX was aborted through the STOP key or by irregular circumstances	Info only
08	3 ID RECEIVED WHILE WAITING FOR CFR	The remote receiver did not understand our answer to its ID	Check line connection. The other machine can be incompatible. Send to another machine. Adjust output level. Exchange FCU - LIU
09	FALL BACK IMPOSSIBLE	It was not possible to send or received an acceptable training signal	Check line connection. The other machine can be incompatible. Send to another machine. Adjust output level. Exchange FCU - LIU

Nr.	Error message	Description	Action
10	ABSOLUTELY NO LOCAL RESPONSE FROM REMOTE INTERRUPT	The remote machine issued a voice request, but the local operator did not respond	Check SW settings, try to send to another machine. Adjust out put level and/or sensitivity
11	LINE BUSY	Busy tone detected during fax communication	Control the line. For PABX operations, check fax settings.
12	INVALID DCS	The parameter set to the remote transmitter does not correspond to our capabilities	Check SW settings, try to send to another machine. Adjust out put level and/or sensitivity
13	IRRELEVANT RESPONSE	The called machine responded with a wrong frame (T30 violated)	Check SW settings, try to send to another machine. Adjust out put level and/or sensitivity
15	INCOMPATIBLE REMOTE TRANSMITTER	It is no possible to find a common parameter set with the remote transmitter	The other machine can be uncompatible. Send to another machine. Adjust output level. Control settings at remote machine. OK pressed instead of Start for TX.
22	INCOMPATIBLE REM. RECEIVER	Is not poosible to find a common parameter set with the remote RX	The other machine may be incompatible. Control code settings at both ends. Try to send to another machine.
23	SPEED MISMATCH	The remote transmitter returned in DCS a higher scan speed then the default DIS setting	The other machine may be uncompatible. Control code settings at both ends. Try to send to another machine.
26	NO POST MSG OR LOCAL INTERRUPT AT STATE F	Voice request was not acknowledged	The other machine may be incompatible. Check line connection Try to send to another machine. Adjust output level. Exchange FCU -LIU
27	PHONE DISCONNECT	Connection terminated during voice request	Posibly the line was disconnected.
31	COVER OPEN DETECTED	The paper cover was opened.	Check cover. Check internal connections. Replace sensor. Replace FCU
33	COMMUNICATION TIME OUT	The receiver does not reply within the specified time.	The other machine may be incompatible. Check line connection Try to send to another machine. Adjust output level. Exchange FCU -LIU. PBX settings.
34	REMOTE REJECTED	Unauthorized caller was rejected	Information only
38	NO LOOP CURR	No signal detection from Tel- line	Check line connection. LIU. FCU
40	PAPER OUT	No paper detected	Check paper , check or replace SPP paper sensor. Check internal connections. Replace FCU
41	DOCUMENT JAM	Document was longer than specified.	Check or replace the document sensor SSB. Check scanner motor, check int. connections. Replace FCU
45	PRINT OVERHEAT	Thermal Print Head overheat detected	Check FCU and Pick-up Module. Replace.
46	BUSY DETECT	The tone detection detected a valid busy tone sequence and the vp_handlerissued an EV_disconnect event. Only valid if bitswitch 11/0 set	For PABX applications, check installation parameters. Check line connections.
55	FOIL OUT	No Foil detected	Check stripe position. Check sensor and FCU.
56	PAPER JAM_ DOCUMENT	Document too long. Document to thick.	Check sensor, ADF.
57	MEMM FULL	Memory full detected.	Are there dokuments in memory? Is there any voice messages left ? Check Memory / Delete Memory
58	PAPER JAM	Paper is continuosly detected in the Pick Up Module	Check Pick Up rollers, sensor SPP Replace FCU.
59	FAX ERROR	Internal error detected	Test machine functionality. Power Off/On
60	NO REMOTE VR	Signal VR - Voice Request no detected	The third party did not respond to the required signal. Test with another machine. Change FCU / LIU

9.3 ERROR MESSAGES

Error message	Reason	Action
NO DIALTONE	Machine can not detect the dialtone.	Try ONHOOK dialling to determine which dialtone can not be detected. Check PABX/PSTN setting. Switch off dialtone detection.
NO LOOP CURRENT	No loop current detected.	Check line cable. Check LIU connectors. Switch off loop current detection.
NO CONNECTION	Other party is either busy or does not reply.	Check with manual dialling. PABX Parameters incorrect
REDIAL FAILED	No connection after 3 attempts.	Check with manual dialling. Try calling later.
TRANSMISSION ERROR	Too many errors during transmission.	Check the line connection. The other machine may be defect or incompatible, try sending to another machine. Adjust output level. Switch on echo cancelling.
OUT OF PAPER	Plain Paper wrong Loaded	Replace paper. Check sensor. Replace SPP sensor or FCU.
DOCUMENT JAM	Documents to thick, wide or.. Document longer than 60cm. Document stuck in ADF	Set the max Document length. Check SAF sensor.

9.4 PROBLEM LIST

Description	Reason	Action
After pluging of the mains cable, 1. The machine reacts with a audible gear movement but LCD and keypads are dead.	1. The power supply is OK. The panel cable is damaged or not correct plugged. Panel or panel driver is defect.	1. Check the panel cable for damages and control the plug (P403) for correct seat. Measure on P403 between: pin 2 and 1 = 5 V DC pin 2 and 8 = clock signal If there is a fault exchange the FCU otherwise exchange the OPU.
2. The machine reacts not at all.	2. All voltages missing or there is a defective on the FCU.	2. Check the mains cable for damages. Measure on P401 between: pin 6-7 and 8-9 = 24 V DC pin 6-7 and 10 = -5 V DC pin 6-7 and 5 = 5 V DC If no voltages are recognizeable exchange the PGU otherwise exchange the FCU.
There are no faults in the scanning path (The quality of a sended document is OK) but the copy quality and the printer test pattern are bad.	There is a damage in the printing path. A damaged semiconductor on the FCU cannot be excluded.	Check all TPH cables for damages. Control the plugs P409, P406 for correct seat. During printing measure on P409 between: pin 1 and 9 = 24 V DC pin 1 and 4,5,7 = strobes clear visible. If no signals are recognizeable, try to exchange FCU otherwise exchange mechanical module.
There are no faults in the printing path because printouts of received fax messages and printer test pattern are OK but printouts made in copymode are not.	A damaged semiconductor on the FCU cannot be excluded.	1. Check connection between FCU and CIS. Measure on P405 (DYNA) P435 (ROHM) : pin 4 and 1 = 24V DC pin 4 and 7 = - 5V DC pin 4 and 8 = 5V DC pin 4 and 3 = clock
1. White or black copies	1. Failed connection between FCU and CIS. Defective CIS, cables or FCU.	If no signals are recognizeable, try to exchange FCU otherwise exchange Scanner Unit.
2. Vertical black lines on the copy, uneven density, blurred or filled-in characters	2. Dirty CIS or roller.	2. if there are sharp peaks or dropouts in the CIS waveform (function 67) clean CIS and roller otherwise exchange Scanner unit.
The machine works, but no telephone conversation, sending and receiving is possible.	There is a defect in the line interface unit. It is also possible a fault on the FCU (modem, filtering a.s.o.).	Check tel. line and plug P812 as well as handset cord and P813, inspect also P404 and P434. Measure on P404 between: pin 11 and 12 = 5 V DC pin 11 and 18 = -5 V DC pin 11 and 19 = 5 V DC Before exchanging LIU inspect the voltages on P401.

Description	Reason	Action
1. General dialing does not work. 2. Dialing without Power does not work.	1. There is a fault on LIU or FCU because the FCU generates the dialing signal and the LIU is dialing. 2. In the most countries dialling without power supply is not provided	1. Check cable between P404 and 804. Check all voltages Exchange LIU. 2. Only in UK and I dialling without connection to mains is working. Otherwise exchange the SPR if available.
The device works but it is not possible to receive, or copy because the Printer motor does not work.	Stepper motor or a driver on the FCU is defective, or a blocked gear may be the reason.	Control the gears, if there is a rest of paper in the modul then clean it. Measure on P408 (during printing or scanning routine) between: pin 5 and 4 = rectangle signal pin 5 and 3 = rectangle signal pin 5 and 2 = rectangle signal pin 5 and 1 = rectangle signal pin 5 and DGND = 24 V DC (open collector driver !!!) If the signals are OK exchange the stepper motor otherwise the FCU.
During conversation from an ext. phone, the machine switches to fax reception.	You have paused too long during conversation.	Increase silence detection time or switch it off.
The machine cannot recognize a document or the end of a document. („endless" paper transport) Paper Jam.	The sensosr is blocked or it is not possible for the FCU to inquire it.	Check the sensor lever and the cable between sensor and FCU. Measure P471 between: pin 1 and 2 = 5 V DC pin 1 and 3 = sensor signal. Exchange mechanical modul.
The machine can not recognize the Plain paper or the end of the Plain paper.	The sensor SPS (sensor paper stock) is stuck or it is not possible for the FCU to inquire it.	Check the sensor and check the cable between sensor and FCU. Measure P451 between: pin 1 and 6 = 5 V DC pin 1 and 7 = sensor signal Exchange mechanical modul.
Double ringer. Machine detects each part of the ringing signal. Machine sees 1 2 3 4 Should be.. 1 2	Ring count which can be adjusted by the user is not correct. eg.: ring count setting: 3 rings but machine rings 6 times.	Set NCU 04 to 100.
No connection within a PABX.	TIME/EARTH-Break setting is not correct.	Check the setting in function 15.
When a number was dialed from an ext. phone, the machine goes on line.	It is possible if the ext. phone works with pulse dial that a device which is connected to the same telephone plug rings, too. The machine interprets this as an incoming ring and goes on line.	Set NCU 05 to 010
No regular operation with ext. TAM.	Wrong priority in the telephone line or wrong ring count setting.	The fax must have first priority in the telephone line. Set the ring count of the fax higher than the ring count of the ext. TAM.
External devices don´t work.	Check setting (Function 31/32). Inspect connection between line and external devices.	Check if there is any parallel connections. Check cables and/or adaptors in between.

10 TECHNICAL DATA

10.1 SPECIFICATION

10.1.1 General specifications

Items	Specification
Type	Desk-top type, transceiver (Half duplex)
Telephone circuit	PSTN and compatible with most common PABX
Input document capacity - Up to 10 pages	1. Size 238x77 mm 2. A4-Format 3. Thickness: 100gr max
Scanning method	Contact Image Sensor (CIS)
Printing method	Thermal Transfer - Ink filn to standard Plain Paper
Recording paper capacity	Up to 50 sheets
Recording paper feed	Automatic paper feed

10.1.2 Communication quality

Items	Specification
Maximum time/line	TX 10ms/line RX standard: 20 ms/line detail: 10 ms/line
Protocol	ITU T30 binary
Date compression method	MH, MR coding,
Modulation method	1. Message: V29, V27ter 2. Protocol: V21
Data transmission speed	9600 / 7200 / 4800 / 2400 bps, automatic shift down
Sequence of protocol signal	NSF —> CSI —> DIS
Transmission time	Chart: ITU #1 Resolution: Standard Bit rate: 9600 bps Protocol time: excluded
Protocol time	Conforms to ITU T30 standard, T30 new

10.1.3 Scanning quality

Items	Specification
Max. scanning width	216mm ± 1mm Reduced Quality
Valid scanning width	210mm ± 1mm Full Quality
Scanning length	Depends on document length, 2 - A4 sheets **Invalid scanning area** top of page: max. 4.6mm bottom margin: max. 4mm
Threshold level	dynamic automatic back gr. control, typ. 0.38 (density)
Resolution	8 pels / mm
1. Main scanning	1. Standard: 3.85 lines / mm
2. Sub scanning	2. Detail: 7.7 lines / mm
Colour response	**1. To read colour chart** a) 80% blue 100% of the area b) 80% red 100% of the area c) 80% violet 100% of the area d) 100% green 100% of the area **2. Not to read colour chart** (Drop out colour) a) yellow 100% b) PM-J 100%

10.1.4 Printing quality

Items	Specification
Paper width	Size A4
Valid printing width	206mm min. (1624pels)
Printing length	Depends on document length and density (2xA4..)
Paper empty indication	By a sensor

10.1.5 Copy quality

Items	Specification
Background density	Less than 0.12
Uneven density	Less than 0,3 (Macbeth densitymeter)
Resolution	Main scanning: 8 pels/mm
	Sub scanning: 7.7 lines/mm

10.1.6 Other features

Items	Specification
Voice request	Voice request at the end of communication is in accordance with the ITU T30 protocol. (User has to lift the handset before end of communication.)
Automatic fax starting	When the machine detects a CNG signal reception starts automatically. Else the machine starts receiving after the programmed ring counts.
Manual starting receiving fax	Transmission starts when manual operation is performed (start key).
Copy mode	Copy operation is possible, using internal scanner and printer.
Time indicator 1. Time accuracy 2. Clock adjustment	 <± 134 sec/month Possible to adjust the time using operation panel.
Power Stand by mode	Less than 3W - the machine remains always in Stand by when not in use.

10.1.7 Audible alarm

Items	Specification
Continuous sound n.a.	Error LED is flashing.
Continuous sound (short)	End of communication. With fax reception not necessary
Discrete sound (n.a.)	Handset off-hook
Key confirmation	Confirmation of key press
	ACK tone (40 msec.) - 2kHz
	NAK tone (3x20 msec.) - 2kHz

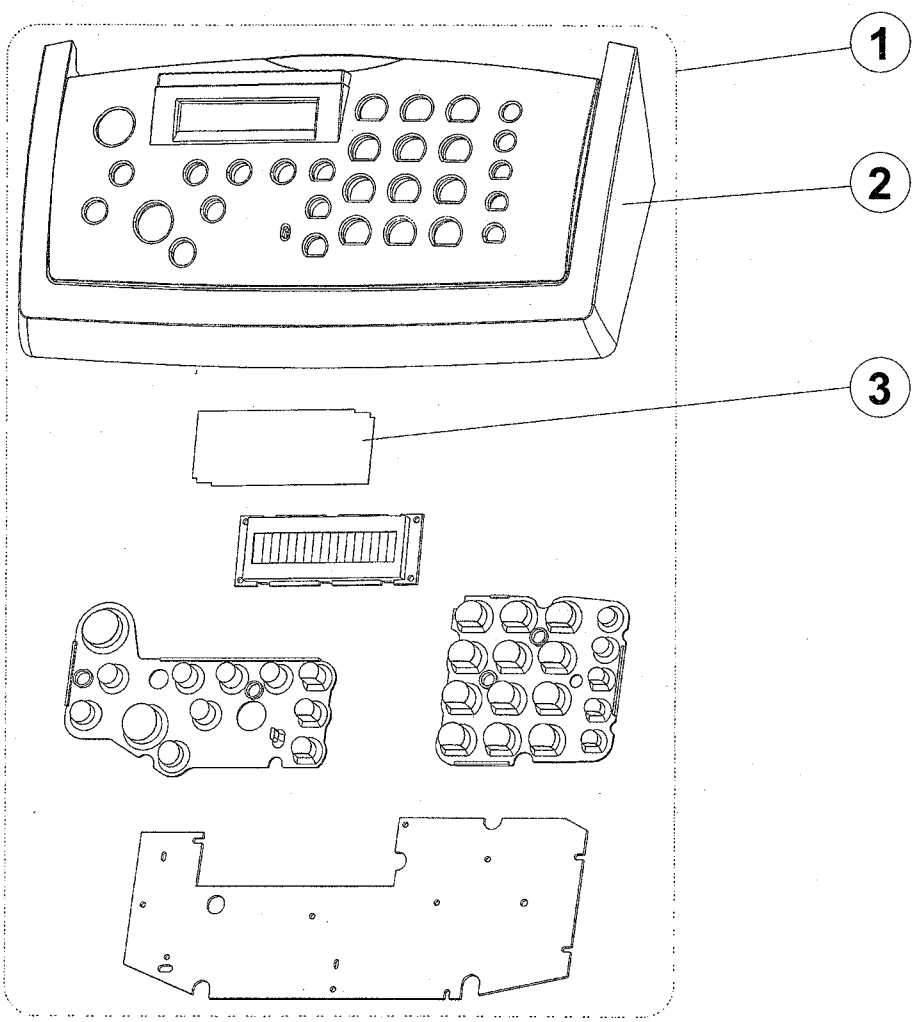
IV Spare parts

exploded view

11 PARTSLIST

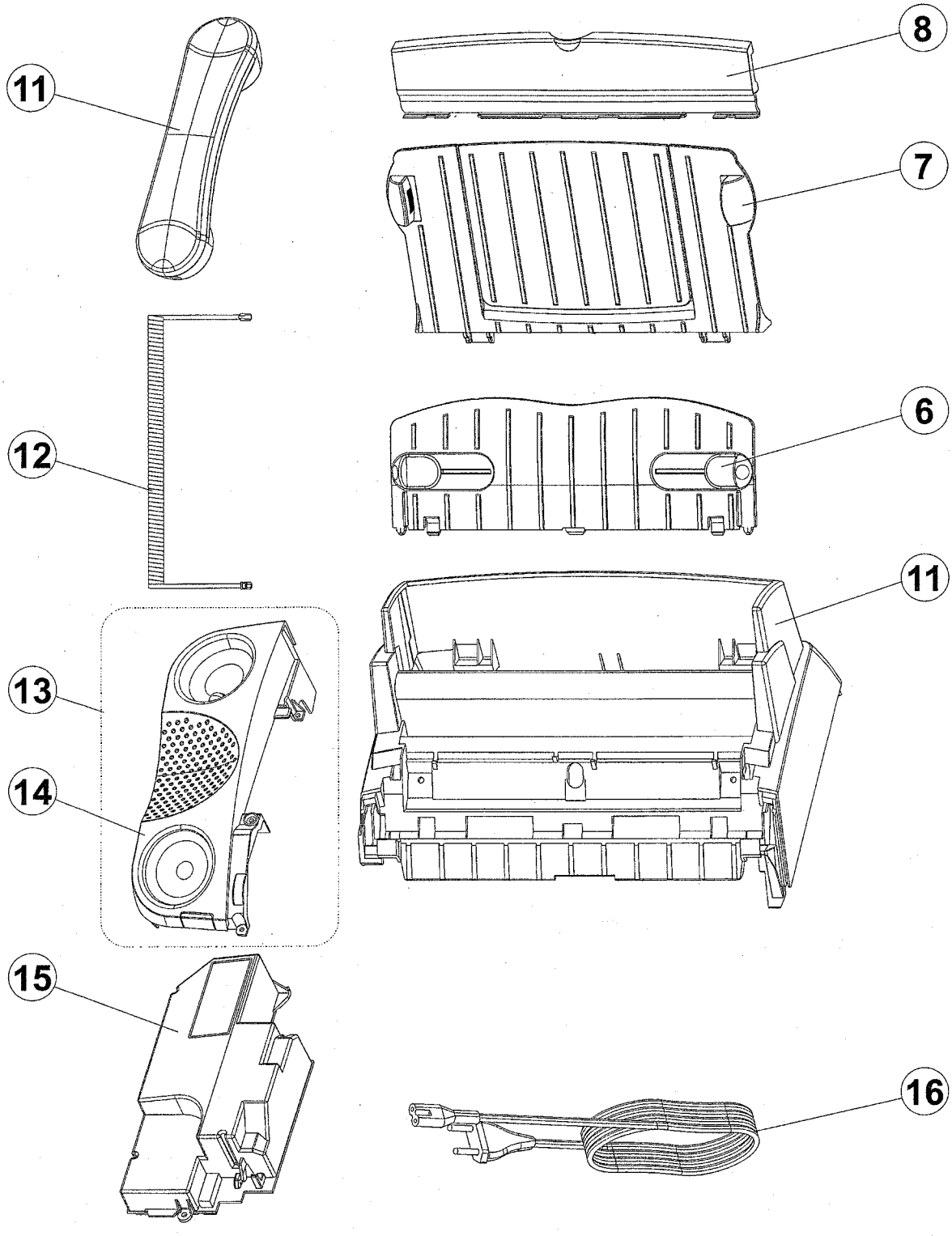
11.1 MECHANICAL AND ELECTRICAL PARTS

11.1.1 Panels



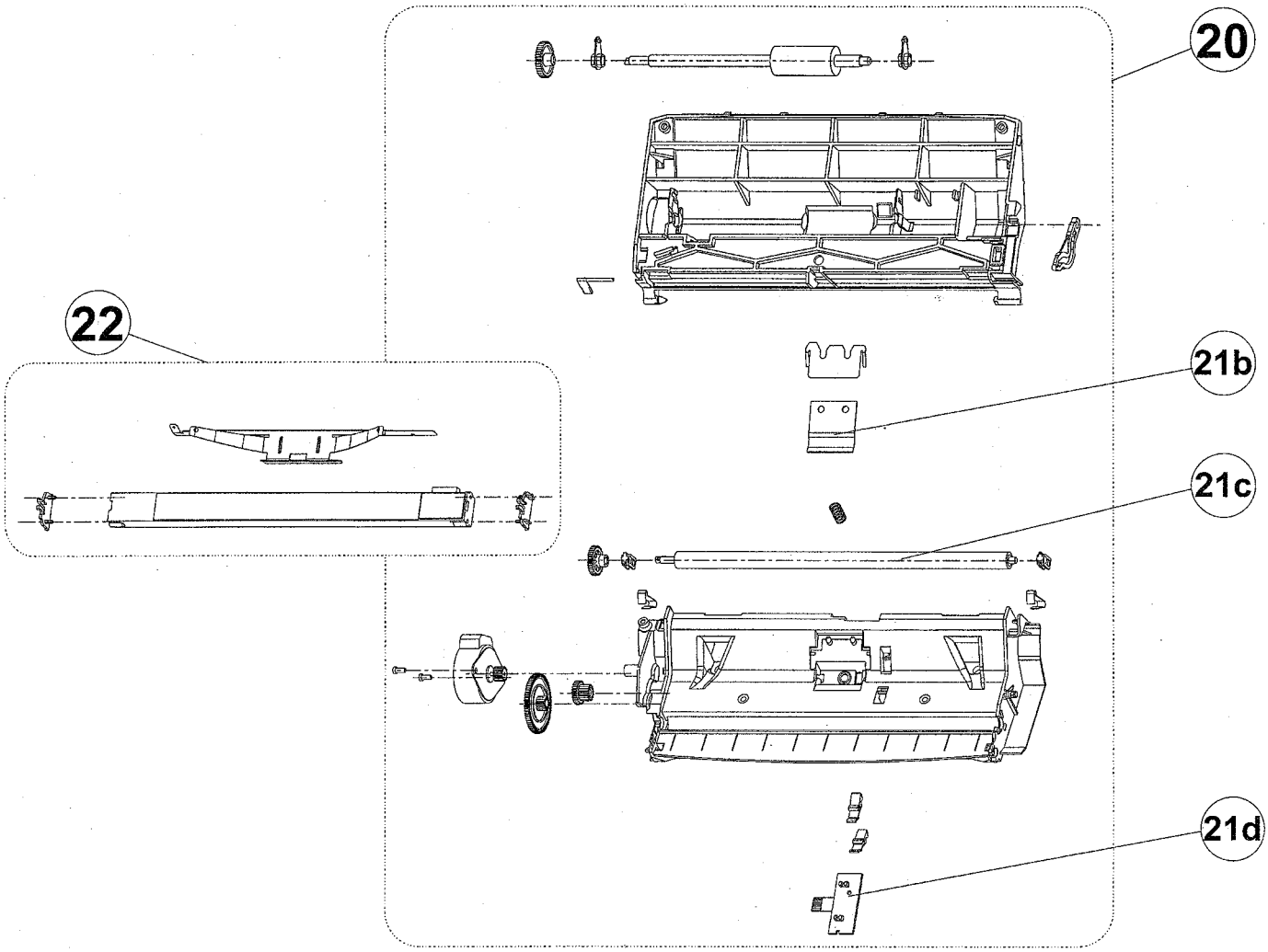
Nr.:	Description	Remark	Codenumber
1	Front Panel, complete	PPF241/ENGL.	5103 508 78990
	Front Panel, complete	PPF241/FR	5103 508 79550
	Front Panel, complete	PPF241/Chinese simplified	5103 508 80260
	Front Panel, complete	PPF271/ENGL.	5103 508 79000
	Front Panel, complete	PPF271/FR	5103 508 79560
	Front Panel, complete	PPF271/Chinese simplified	5103 508 80270
	Front Panel, complete	PPF242/ENGL.	5103 508 80240
	Front Panel, complete	PPF272/ENGL.	5103 508 80250
	Front Panel, complete	PPF211/ENGL.	5103 508 80230
	Front Panel, complete	PPF211/FR.	5103 508 80280
	Front Panel, complete	PPF251/ENGL.	5103 508 80290
	Front Panel, complete	PPF251/FR.	5103 508 80300
	Front Panel, complete	PEGASO (PTT/Italy)	5103 508 79960
2	Front Panel, printed	PPF241/ENGL.	5103 507 62550
	Front Panel, printed	PPF241/FR	5103 507 62930
	Front Panel, printed	PPF241/Chinese simplified	5103 507 63680
	Front Panel, printed	PPF271/ENGL.	5103 507 62560
	Front Panel, printed	PPF271/FR	5103 507 62940
	Front Panel, printed	PPF271/Chinese simplified	5103 507 63690
	Front Panel, printed	PPF242/ENGL.	5103 507 63660
	Front Panel, printed	PPF272/ENGL.	5103 507 63670
	Front Panel, printed	PPF211/ENGL.	5103 507 63650
	Front Panel, printed	PPF211/FR.	5103 507 63700
	Front Panel, printed	PPF251/ENGL.	5103 507 63710
	Front Panel, printed	PPF251/FR.	5103 507 63720
	Front Panel, printed	PEGASO (PTT/Italy)	5103 507 63400
3	Panel window		5103 504 18560

11.1.2 Housing parts - top



Nr.:	Description	Remark	Codenumber
6	Document tray	for all PPF 2xx	5103 507 62630
	Document tray	for PEGASO (PTT/Italy)	5103 507 63420
7	Paper tray		5103 507 62620
8	Flat cover		5103 504 19520
9	Rear cover		5103 507 63070
11	Handset		5103 508 79590
12	Handset cord		5103 508 79580
13	Handset cover, assy	incl. Pos. 14	5103 507 62640
14	Handset cover		5103 504 19770
15	Power Unit	220-240V~	5103 509 21900
	Power Unit	110V~	5103 509 23950
16	Power cord/EURO		5103 508 79370
	Power cord/UK		5103 508 79570
	Power cord/CHINA		5103 508 80210

11.1.3 Scanner Module

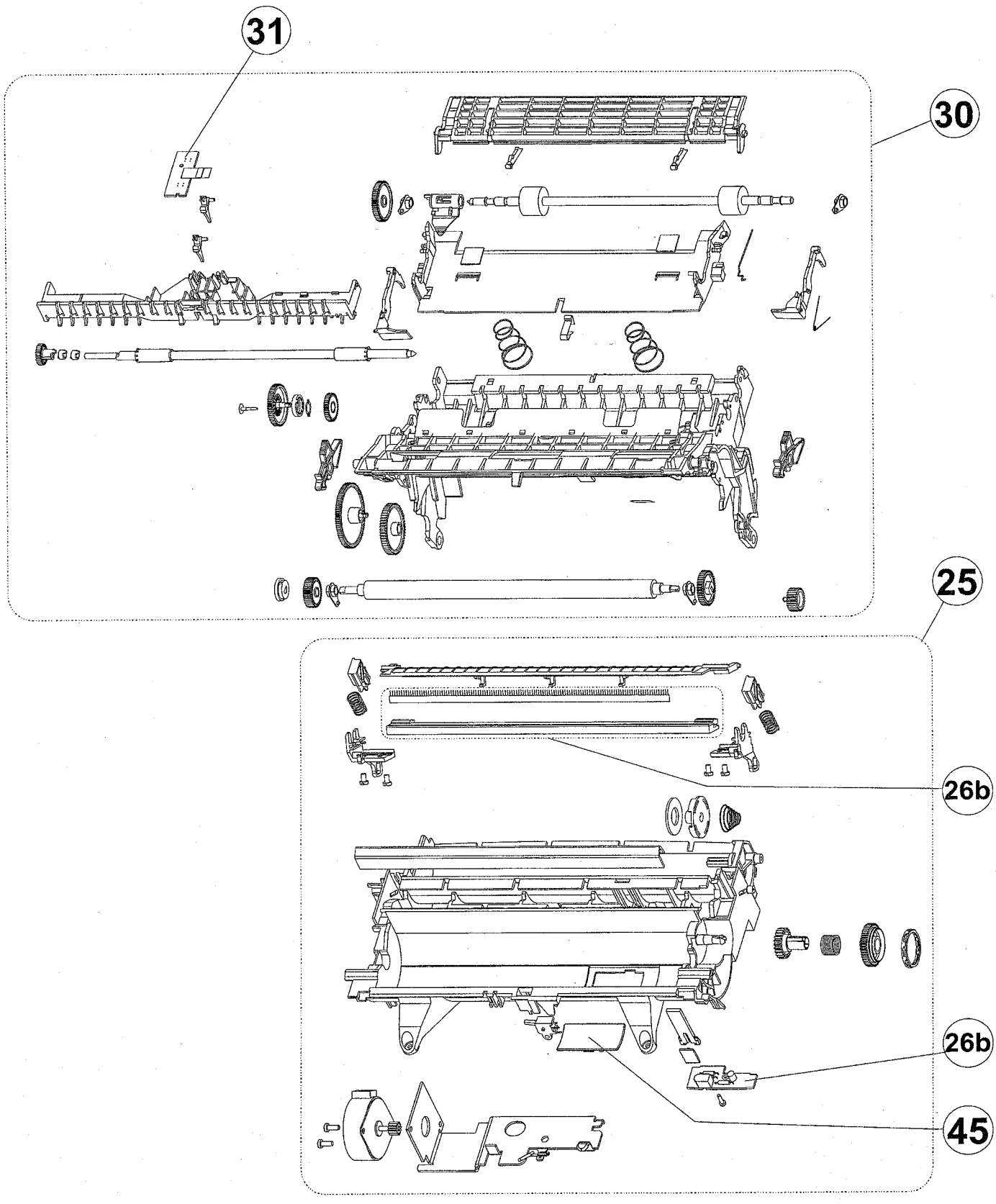


Nr.:	Description	Remark	Codenumber
20	Scanner module	incl. Pos. 21b, 21c, 21d	5103 509 43490
21b	ADF lip		5103 504 41430
21c	Sensor: Scanner		5103 508 13050
21d	Scannerroller		5103 508 78890
22	CIS module	incl. CIS-cable	5103 509 43310

extra Cables

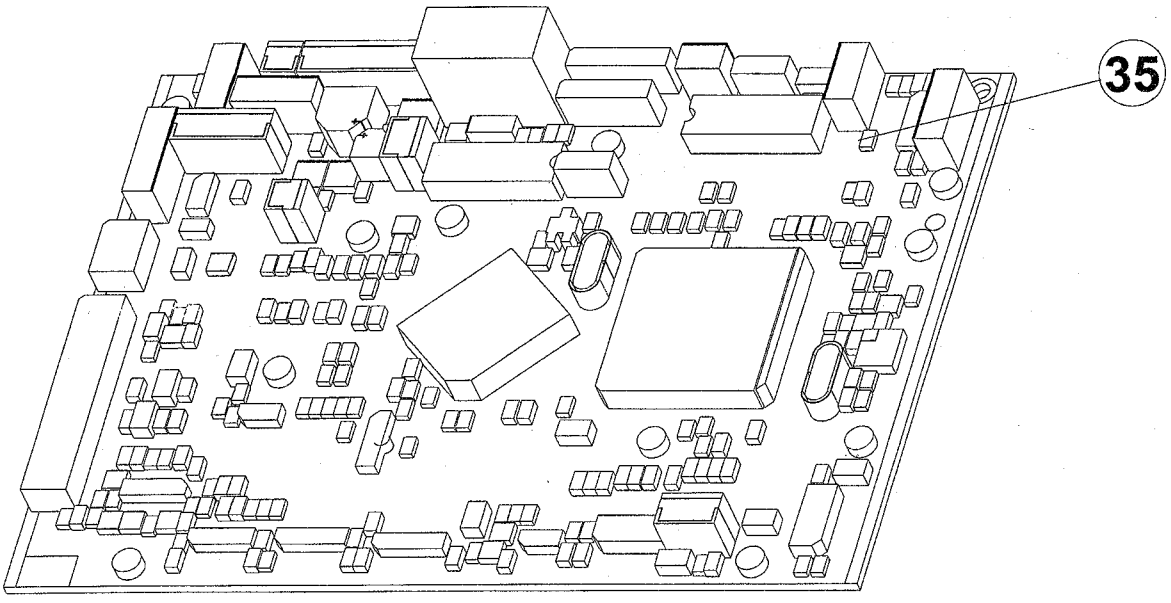
Nr.:	Description	Remarks	Codenumber
50	Cable (FCU-OPU) 8p		5103 508 79120
51	Cable (HSB-FCU) 2p		5103 508 79250
52	Cable (LIU-HSB) 8p		5103 507 83590
53	Cable (FCU-LIU) 27p		5103 508 79130

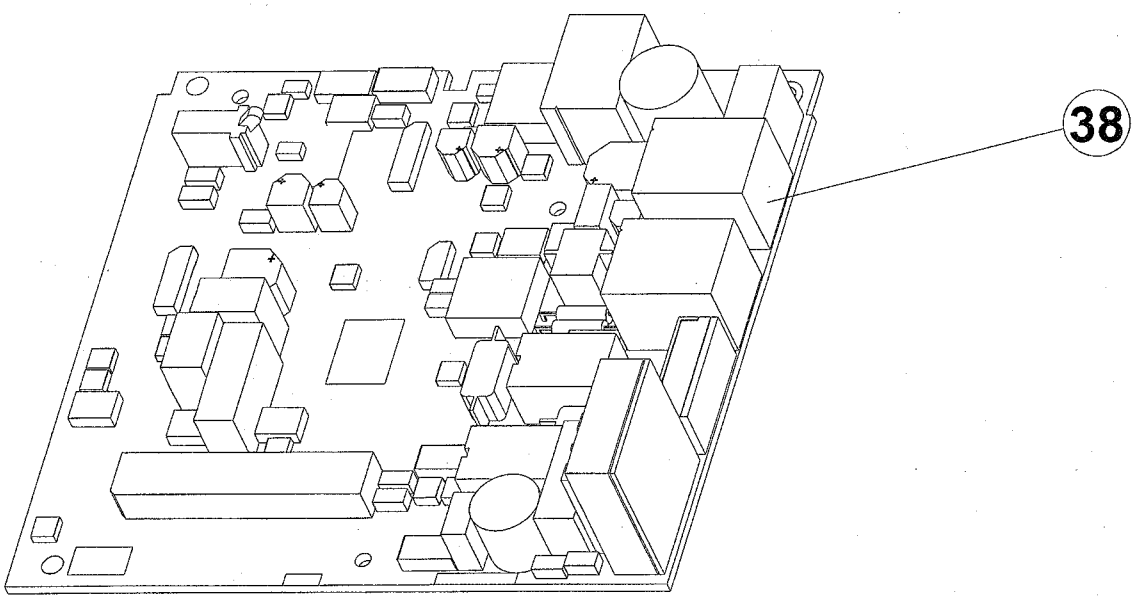
11.1.4 Printer / PickUp - Module



Nr.:	Description	Remark	Codenumber
25	Printer module	incl. Pos. 26a, 26b	5103 509 43340
26a	Printerhead		5103 509 43330
26b	Sensor: Inkfilm		5103 508 13040
30	Pick-Up module	incl. Pos. 31b	5103 509 43350
31b	Sensor: Paper		5103 508 13030

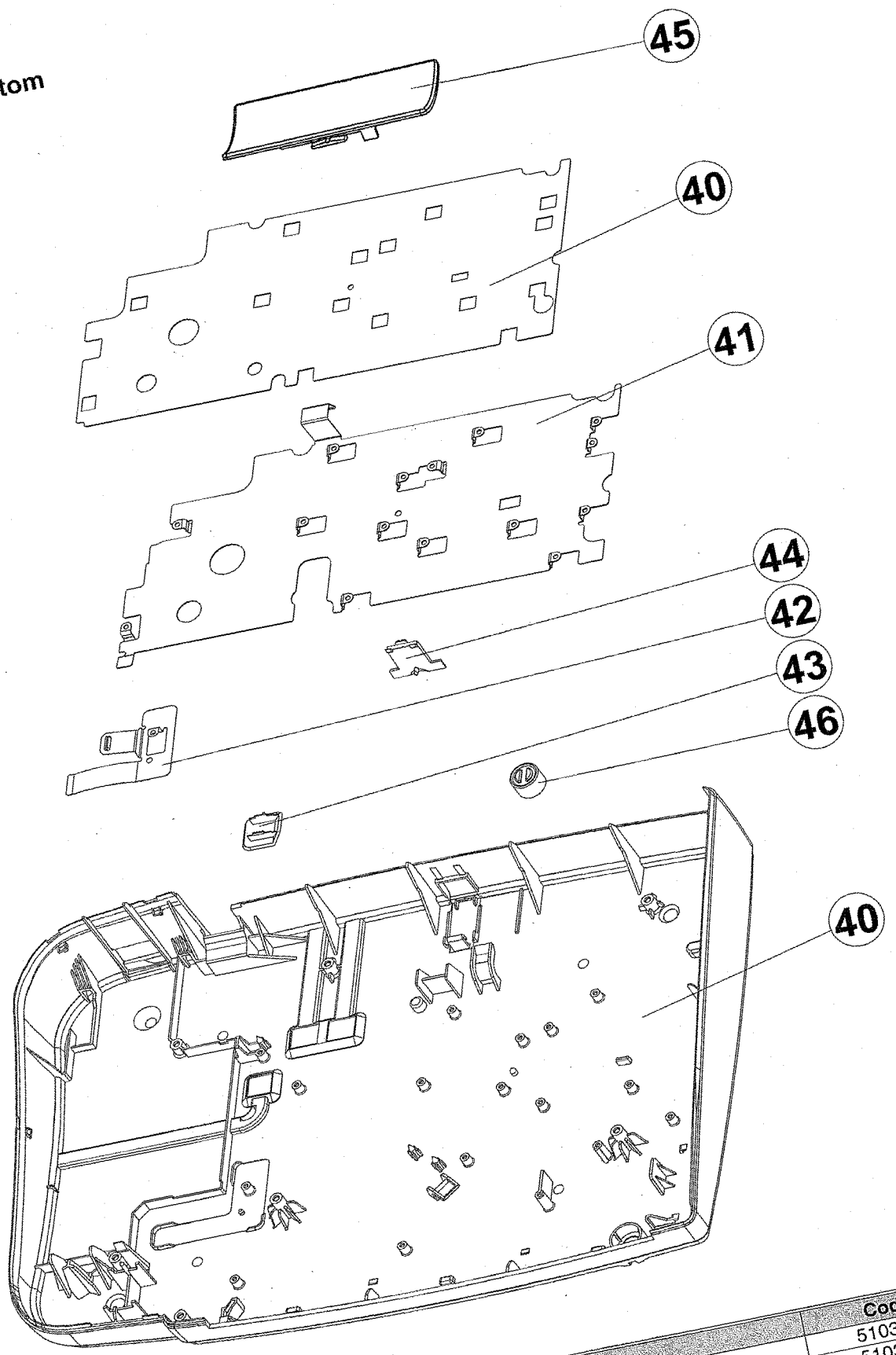
11.1.5 Printboards - PCBs





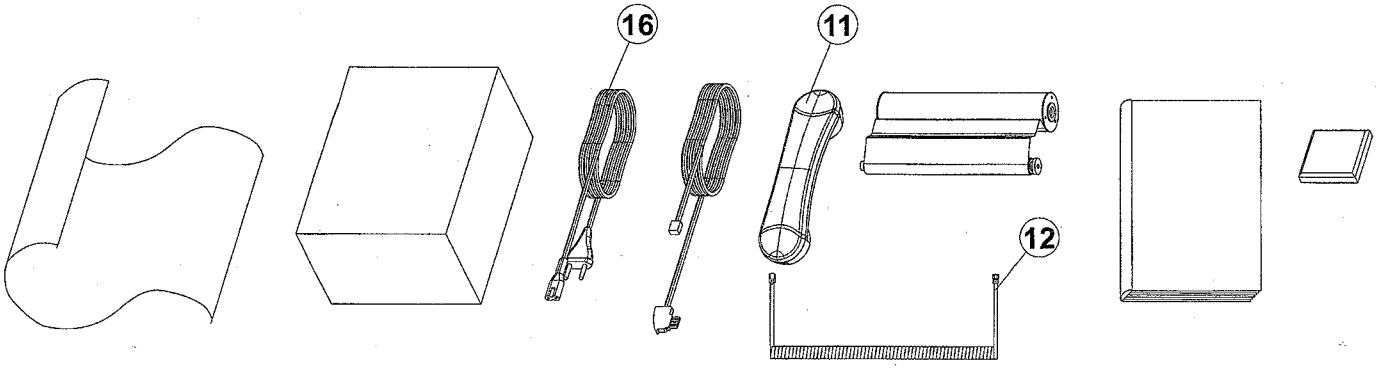
Nr.:	Description	Remark	Codenumber
35	FCU G1	for PPF 211/241/242 and "PEGASO"	5103 508 13210
	FCU G2	for PPF 271/272/273/281	5103 508 13320
	FCU G1 memo	for PPF 251	5103 508 13370
38	LIU	for D all types expect PPF211	5103 508 12540
	LIU	for N all types expect PPF211	5103 508 12610
	LIU	for UK all types expect PPF211	5103 508 12570
	LIU	for CH all types expect PPF211	5103 508 12590
	LIU	for IRE all types expect PPF211	5103 508 13360
	LIU	for I all types expect PPF211	5103 508 12580
	LIU	for INT,NL,A,B,E,P,.... all types expect PPF211	5103 508 12560
	LIU	for S all types expect PPF211	5103 508 12600
	LIU	for F all types expect PPF211	5103 508 12550
	LIU	for DK all types expect PPF211	5103 508 13340
	LIU - Low function	only for PPF 211/02 (D)	5103 508 13230
	LIU - Low function	only for PPF 211/05 (GB)	5103 508 13250
	LIU - Low function	only for PPF 211/08 (I)	5103 508 13260
	LIU - Low function	only for PPF 211/xx (UNI,NL,B,E,...)	5103 508 13270
	LIU - Low function	only for PPF 211/19 (F)	5103 508 13240

11.1.6 Housing parts - bottom



Nr.:	Description	Remark	Codenumber
40	Isolation plate		5103 504 18570
41	Bottom shielding		5103 501 42250
42	Ground connector	only for A,F and for all PPF211	5103 501 42360
43	Line cover		5103 504 19750
44	Feature cover		5103 504 19840
45	Software cover		5103 504 19420
	SAVETY label	PEGASO, and acc. Service Info.	5103 506 25370
46	Microphone	only for type 271 or higher	5103 508 79600
49	Bottom		5103 507 62570

11.1.7 Accesories



Nr.:	Description	Remarks	Codenumber
	Telephone cord	for D	5103 507 83060
	Telephone cord	for NL	5103 507 82700
	Telephone cord	for N	5103 507 83260
	Telephone cord	for UK	5103 507 82080
	Telephone cord	for I (expect PPF211)	5103 507 83620
	Telephone cord	for PEGASO (PTT/Italy)	5103 507 83610
	Telephone cord	for CH	5103 507 83550
	Telephone cord	for A	5103 507 83090
	Telephone cord	for INT,S'pore,(B),.....	5103 507 82280
	Telephone cord	for IRE,P,E	5103 508 73740
	Telephone cord	for F	5103 507 82570
	Telephone cord	for S	5103 507 82710
	Telephone cord	for SF	5103 507 82310
	Telephone plug	for B	5103 508 73370
	Telephone cord PPF211	for PPF211/CH	5103 507 82270
	Telephone cord PPF211	for PPF211/I	5103 507 82690
	Telephone cord PPF211	for PPF211/B,E,P	5103 507 82280
	Telephone adapter cable	for D (expect PPF211)	5103 508 79400
	Telephone adapter cable	for N (expect PPF211)	5103 507 82280
	Telephone adapter cable	for CH (expect PPF211)	5103 507 83520
	Telephone adapter cable	for I (expect PPF211)	5103 507 83540
	User manual for PPF 241/251/271	for N	5103 506 16290
	User manual for PPF 241/251/271	for I	5103 506 16100
	User manual for PPF 241/251/271	for D	5103 506 15800
	User manual for PPF 241/251/271	for NL	5103 506 16040
	User manual for PPF 241/251/271	for F	5103 506 16120
	User manual for PPF 241/251/271	for UK	5103 506 16060
	User manual for PPF 241/251/271	for E	5103 506 16140
	User manual for PPF 241/251/271	for SF	5103 506 16720
	User manual for PPF 241/251/271	for P	5103 506 16520
	User manual for PPF 241/251/271	for DK	5103 506 16730
	User manual for PPF 241/251/271	for Chinese simplified	5103 506 16740
	User manual for PPF 242/272	for D	5103 506 16760
	User manual for PPF 211	for UK	5103 506 16810
	User manual for PPF 211	for I	5103 506 16800
	User manual for PPF 211	for D	5103 506 16770
	User manual for PPF 211	for NL	5103 506 16780
	User manual for PPF 211	for F	5103 506 16790
	User manual for PPF 211	for F	5103 506 16820
	User manual for PEGASO	for PTT/Italy	5103 506 16500
	Service A-Box		5103 506 71200
	Air-bubble-foil		5103 506 50680
	Inkfilm	ONLY FOR SERVICE !!!!!!	5103 509 24020
	IC OPT, empty		5103 509 23650

11.1.8 Firmware

For codenumber of the firmware see table downstairs. The codenumber of the software is 5103 509 xxxxx.

For xxxxx see:

	PPF 211	PPF 241 PPF 242	PPF 271 PPF 251	PPF 272 PPF 281	PPF 276	PTT "PEGASO"
/00		31300		31410		
/02	32160	31200	32230	31310	32440	
/03	32170	31210	32240	31320	32450	
/04		31620		31630		
/05	32180	31220	32250	31330	32460	
/06		31230		31340		
/07		32420		32430		
/08	32190	31240	32260	31350	32470	
/09		31250		31360		
/10	32200	31260	32270	31370	32480	
/13		31270		31380		
/14		32380		32390		
/16	32210	31280	32280	31390	32490	
/17		32400		32410		
/19	32220	31290	32290	31400	32500	
/20		32360		32370		
/30		32300		32310		
/78		32320		32330		
/86		32340		32350		
/91						32150

12 GLOSSAR

ABC	Automatic Background Control
ACK	Acknowledge
ADF	Auto Document Feeder
AM	Amplitude Modulation
AVM	Auto Voice Message
ASIC	American Standard Interchange Communication
bps	bits per second
BSW	Bitswitch
BT	British Telecom
BUZCLK	Buzzer Clock
BUZON	Buzzer On
CCD	Charge Coupled Device
CE	Consumer Electronic
CED	Called
CFR	Confirmation to Receive
CIS	Contact Image Sensor
CLK	Clock
CNG	Calling
CRP	Command Repeat
CODEC	Coder/Decoder
CPU	Central Processing Unit
CSI	Called Subscriber Identification
DCN	Disconnect
DCS	Digital Command Signal
DEC	Decimal
DIS	Digital Identification Signal
DTMF	Dual Tone Multiple Frequency
EOM	End Of Message
EOP	End Of Procedure
EPROM	Erasable Programmable ROM
ESD	Electrostatic Discharge
FAX	Facsimile
FBP	Feature Box Power
FCB	Fax Control Board
FCC	Flex Coiled Cable
FCF	Fax Control Field
FCU	Fax Control Unit
FM	Frequency Modulation
FOSCI	Fast Oscillator Input
FSK	Frequency Shift Keying
FTT	Failure To Train
HDLC	High Level Data Link Control
HEX	Hexadezimal
HSB	Hook Switch Subboard
HW	Hardware
ICM	Incoming Message
ICR	Incoming Ring
ILED	Input LED
IRB	Infrared Board
ITU	International Telecommunication Union (former CCITT)
LCD	Liquid Crystal Display
LIU	Line Interface Unit
LCD	Liquid Crystal Display
LPF	Low Paß Filter
LS	Loudspeaker
MCF	Message Confirmation
MCL	Mercury Communications Limited
MHC	Modified Huffman Code
MICEN	Microphone Enable
modem	Modulator/Demodulator
MPS	Multi Page Signal
MRC	Modified Read Code
MRXD	Receive Data
MTXD	Transmit Data
NAK	Not Acknowledge
NCU	Network Control Unit
NDB	Noise Detection Board
NSF	Non Standard Facilities
NSS	Non Standard Facilities Set-up
OGM	Outgoing Message
OPU	Operation Panel Unit
OTPROM	One Time Programmable ROM
P	Page
PABX	Private Automatic Branch Exchange
PCB	Printed Circuit Board
PFAIL	Power Fail
PGU	Power Generation Unit
PIN	Procedure Interrupt Negative
PIP	Procedure Interrupt Positive
PM	Phase Modulation
POTS	Power Off Telephone System
ppm	parts per million
PPM	Plain Paper Motor
PSAVE	Power Save
PWM	Pulse Width Modulation
QAM	Quadrature Amplitude Modulation
RB	Ring Back
RC	Resistor Capacitor
READ	Relative Element Address Designate
ROM	Read Only Memory
RTI	Remote Terminal Identification
RTN	Retrain Negative
RTP	Retrain Positive
RX	Receive
SBG	Signal Background control
SCO	Sensor Cover Open
SDI	Sensor Document In
SDIN	Sigma Delta in
SDOUT	Sigma Delta Out
SGP	Sensor Gear Position
SHC	Sensor Hook Cradle
SIF	Sensor Ink Film
SMPS	Switched Mode Power Supply
SOP	Sensor Out of Paper
SOSCI	Slow Oscillator Output
SSB	Sensor Board
SPP	Sensor Paper Stock and Paper in
SPR	Sub Print Ringer
STM	Stepper Motor
SVI	Signal Video In
SW	Software
S&H	Sample and Hold
TCF	Training Check Field
TM2	Thermistor
TPH	Thermal Printer Head
TPHON	Thermal Head On
TSI	Transmitting Subscriber Identification
TTI	Transmit Terminal Identification
TX	Transmit
VIN	Video In

13 INDEX

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